Araceae of the Flora of Reserva La Planada, Nariño Department, Colombia (Part 1)

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ABSTRACT

The Flora of the La Planada Reserve located in the Nariño Department, Colombia, contains 71 taxa of Araceae with 37 taxa (including one variety), new to science: *Anthurium benavidesae* Croat, *A. bernalii* Croat, *A. chucunesense* Croat, *A. gerherrerae* Croat, *A. gracilistipum* Croat, *A. herrerae* Croat & P. Huang, *A. keatingii* Croat, *A. lakei* Croat & P. Huang, *A. lancea* Sodiro var. *ecostatum* Croat, *A. melampyi* Croat, *A. nestorpazii* Croat & P. Huang, *A. pazii* Croat, *A. pendulispadix* Croat, *A. planadense* Croat, *A. protrudens* Croat, *A. restrepoae* Croat, *A. ricaurtense* Croat, *A. terracolum* Croat, *Chlorospatha bogneri* Croat & L. P. Hannon, *C. planadensis* Croat & L. P. Hannon, *C. ricaurtensis* Croat & L. P. Hannon, *Monstera planadensis* Croat, *Philodendron aurantispadix* Croat, *P. fibrosum* Sodiro ex. Croat, *P. narinoense* Croat, *P. planadense* Croat, *P. prominulinervium* Croat, *P. puhuangii* Croat, *P. verrucapetiolum* Croat, *Rhodospatha herrerae* Croat & P. Huang, *Stenospermation benavidesae* Croat, *S. gentryi* Croat, *S. laevis* Croat, *S. longispadix* Croat, *S. olgae* Croat, *Xanthosoma herrerae* Croat & P. Huang. In addition, one species, *Anthurium martae* Croat & Castaño Rubiano, has achieved new status by being renamed and elevated to species status.

KEY WORDS

Araceae, Colombia, La Planada, Nariño Department, new species.

INTRODUCTION

The La Planada, a 3,200 hectare biological reserve in the Municipio of Ricaurte in Nariño Dept. of Colombia, is located at 01°08'N, 77°04'W. The Reserve was established with the assistance of the World Wildlife Fund 1982 to promote conservation and appropriate community development in the region. It is operated by the Fundación para Educación Superior and is regularly used by Colombian and foreign graduate students and researchers. The Reserve is mapped with the Holdridge Life Zone System as *Premontane wet forest* and ranges in elevation from 1,300–2,100 m. Most of the collections in this study were made in the vicinity of the main camp and

its associated trails at elevations between 1,700–1,900 m so additional species are likely to turn up in time as trails are made further into the Reserve. The forest canopy at La Planada is relatively low, with trees mostly less than 20 m tall. The understory vegetation is even denser than that found at Bajo Calima in Valle Department of Colombia (Croat, 1992) (see also Croat *et al.*, 2006; 2007; 2008) and a much larger percentage of the species occur in rotting debris that has accumulated on the ground. In contrast to Bajo Calima, which is generally quite hot, the temperature at La Planada is substantially cooler, with temperatures averaging 12° to 22° Celsius. Though mornings are usually clear, rains generally begin by late afternoon, as at Bajo Calima, and continue through the night. Average annual precipitation is more than 4,430 mm. Although rainfall is rarely heavy, the region is often beset with cloudy and rainy conditions that may persist for weeks at a time. The soil perhaps never dries out.

An inventory of the generic representation of the La Planada Reserve is *Anthurium* with 43 taxa, *Chlorospatha*, 3 species, *Monstera*, 2 species, *Philodendron*, 11 species, *Rhodospatha*, 2 species, *Stenospermation*, 9 species and *Xanthosoma* with 3 species. The percentage of novelties is high with 43% of the species considered new to science. The rate of endemism is high with 9 species endemic to La Planada or the immediate area around La Planada. In addition the 9 unnamed species (5 *Anthurium* and 4 *Stenospermation*) are likely also to be endemic to the region. Some common aroid genera are notably missing altogether, including *Caladium*, *Dieffenbachia*, *Homalomena* and *Spathiphyllum*. It is interesting to note that the flora of this montane area is so distinct from the lowland aroid flora that not a single species at the La Planada Reserve is present in the aroid florulas of Bajo Calima (Croat *et al.*, 2006, 2007, 2008) near Buenaventura in Valle Dept. and located at elevations near sea level.

Special mention should be made of several collectors who made a significant contribution to the understanding of the Araceae of La Planada. Foremost among these is Gerardo Herrera, a Costa Rican botanist who worked at La Planada with Jens Bittner on a small transect project. He worked from November 1996 until May 1997. While the senior author only spent a total of about 12 days in two separate fieldtrips (*Croat 69545–69672* in 26–28 July 1988; *Croat 71139–71407, 71466–71492, 71578–71584* in March 7–19, 1990) collecting at La Planada, I left reasonably certain that I had collected most of the species that occurred there. Herrera and Bittner collected an astonishing number of Araceae that I did not see including three new species that were named after Herrera.

Other contributors include Jens Bittner who was employed at La Planada from October 1995 until October 1999 by the FES Foundation first as associated researcher, later as coordinator for the research and conservation program. He was responsible for getting his friend, Gerardo Herrera to come to La Planada. Jens also made many collections of Araceae at La Planada including *Monstera planadense*. He also assisted by sending pictures of Araceae that he took at La Planada. Nestor Paz, formerly of the Universidad del Valle (CUVC) also made important collections and *Anthurium pazii* Croat and *Anthurium nestorpazii* Croat are named in his honor. Carla Restrepo, then an undergraduate student associated with the Corporación Autonoma Regiona de Cauca-CVC, worked at La Planada studying birds and while there also collected plants, including *Anthurium restrepoae*.

The earliest collectors should not be forgotten either and include Olga de Benavides, Al Gentry and Mike Melampy. Both Olga de Benavides and Mike Melampy have species named for them in the Flora of La Planada. Olga de Benavides originated work at La Planada and it is my understanding that the original field station was created on what was then her family's property. Olga, a botanist at the Universidad de Nariño in Pasto and Curator of the PSO Herbarium, made most of the earliest collections and has two species, *Anthurium benavidesae* Croat and *Stenospermation benavidesae* Croat, named in her honor.

KEY TO GENERA OF ARACEAE IN LA PLANADA

1. Spadix uniform; flowers hermaphroditic (both sexes present in each flower).
   2. Plants terrestrial.
      3. Leaf blades with conspicuous reticulate venation; spathe persistent, typically even into fruiting condition. . . . . ***Anthurium***
      3. Leaf blades usually with strictly parallel venation; spathe usually deciduous immediately after anthesis (persisting in *Stenospermation gentryi*).
         4. Primary lateral veins lacking or at least very inconspicuous; interprimary veins and minor veins sometimes present but not in descending order of magnitude. . . . . ***Stenospermation***
         4. Primary lateral veins prominent and with a descending order of interprimary veins present between each pair of primary lateral veins. . . . . ***Rhodospatha***
   2. Plants epiphytic or hemiepiphytic.
      5. Blades lacking prominent primary lateral veins. . . . . ***Stenospermation***
      5. Blades with prominent primary lateral veins.
         6. Spathe persistent; berries prominently emerging from the fruiting spadix. . . . . ***Anthurium***
         6. Spathe usually deciduous; berries not conspicuously emergent, merely loosening and falling free.
            7. Blades banana-like, usually oblong-elliptic, entire and not perforated; seeds cochleate. . . . . ***Rhodospatha***
            7. Blades typically perforate or pinnately lobed, rarely oblong-elliptic but then usually not at all banana-like; seeds large, subglobose. . . . . ***Monstera***
1. Spadix divided into male and female portions.
   8. Plants terrestrial.
      9. Stems caulescent, typically with a conspicuous, erect stem; sap not noticeably aromatic; blades thin with reticulate venation, and with several collective veins along the margin of the blade; sap milky.
         10. Peduncle slender, often very elongated and contained usually within petiolar sheath at anthesis; spathe slender without a well developed spathe tube. . . . . ***Chlorospatha***
         10. Peduncle thick, short, not ensheathed for most of its length in petiolar sheath; spathe typically stout with a thickened spathe tube that is usually constricted at apex and well differentiated from the spathe blade. . . . . ***Xanthosoma***
      9. Stems a creeping rhizome; sap with turpentoid smell; pistils many and closely compacted; blades subcoriaceous, with parallel venation and lacking collective veins along the margin of the blade; sap usually turning dark brown or black. . . . . ***Philodendron***
   8. Plants epiphytic or hemiepiphytic, vegetative parts usually lacking milky sap; blades usually subcoriaceous with parallel venation; spathe persistent intact after anthesis. INFRUCTESCENCE a berry, usually with many small, more or less elongated whitish or tan seeds. . . . . ***Philodendron***

Anthurium Schott, Herbs, usually epiphytic, sometimes terrestrial or on rocks; STEMS and **internodes** usually short, rarely elongate and scandent; **cataphylls** usually lanceolate; LEAVES commonly clustered near apex; **petioles** sheathed near base, geniculate at apex, variable cross-sectional shape; **blades** diversely

shaped, simple and entire or lobed to compoundly divided, net-veined, the **primary lateral veins** and **basal veins** often forming a collective vein along the margin, the basal veins often united into a posterior rib; the surfaces sometimes glandular-punctate on one or both surfaces. INFLORESCENCE one per node; **peduncle** usually elongate; **spathe** usually flat, persistent, usually free before anthesis, usually spreading to reflexed, sometimes erect to hooding, usually lanceolate, inserted on peduncle at an oblique angle; **spadix** uniform, usually slightly tapered, variously colored. Flowers perfect, usually protogynous, closely aggregated in spirals; tepals 4, triangular and cucullate at apex, mostly covering pistil; pistils simple, 2-celled; stigma usually a slit-like depression; stamens 4, usually weakly exserted; filaments flattened; anthers broader than long, thecae usually ovoid; berries variously colored, exserted at maturity, usually 2-seeded, sometimes 4 or more seeded.

KEY TO SPECIES OF ANTHURIUM IN LA PLANADA

1. Blades conspicuously lobed, sagittate or cordate at the base.
   2. Plants more or less scandent (or at least with internodes much longer than broad); internodes 4 cm long or more, the stems not closely appressed with short internodes.
      3. Blades drying reddish brown or blackened, the surfaces usually semiglossy (at least on lower surface); cataphylls less than 6 cm long and persisting intact (*A. herrerae*) or 9–13 cm long, persisting intact and drying black or deciduous, sometimes persisting as thin fibers at upper nodes.
         4. Cataphylls deciduous or with only a few fine fibers persisting at nodes; blades drying dark brown to blackened, sometimes with the anterior lobe constricted midway; no part of plant ever visibly infected with a fungus. . . . . *A. nigrescens* Engl.
         4. Cataphylls persisting intact at nodes (may be broken off toward apex); blades never drying blackened, usually medium yellow-brown); all parts infected with fungal pustules. . . . . *A. herrerae* Croat & P. Huang
      3. Blades drying light brown to greenish brown, matte to velvety on upper surface, more or less matte below; cataphylls 10–27 cm long, persisting light brown or tan, semi-intact at upper nodes, sometimes scarcely fibrous but usually persisting as a loose network of pale fibers closely appressed to the stem, eventually deciduous. . . . . *A. martae* Croat & Castaño Rubiano
   2. Plants terrestrial or appressed-climbing epiphytes with internodes short, commonly about as long as broad.
      5. Leaf blades matte and velvety above.
         6. Blades with primary lateral veins sunken on upper surface.
            7. Blades narrowly ovate-elliptic to triangular ovate, only weakly cordate at base. . . . . *A. alluriquinense* Croat
            7. Blades ovate-cordate, conspicuously cordate at base.
               8. Cataphyll intact; blades vaguely punctate below; primary lateral veins less than 8 per side; spadix white. . . *A. esmeraldense* Sodiro
               8. Cataphyll soon fibrous; blades epunctate below; primary lateral veins more than 15 per side; spadix bluish green or maroon.
                  9. Blades to ca. 75 cm long, drying green; posterior rib naked part less than 4 cm; spadix bluish green. . . . . *A. pulverulentum* Sodiro
                  9. Blades usually less than 55 cm long, drying red-brown; posterior rib naked part more than 6 cm; spadix maroon. . . . . *A. planadense* Croat

6. Blades with primary lateral veins raised on upper surface.
   10. Leaf blade drying brown, frequently more than 70 cm long; spadix greenish to yellowish brown at anthesis.. . . . *A. umbraculum* Sodiro
   10. Leaf blade drying green, less than 70 cm long; spadix purplish at anthesis. . . . . .*A. martae* Croat & Castaño Rubiano

5. Leaf blades glossy to semiglossy on upper surface.
   11. Cataphylls persisting intact (Sect. *Calomystrium*).
      12. Blades not conspicuously dark glandular-punctate.
         13. Blades with primary lateral veins raised above, at least upon drying.
            14. Spathe more or less elliptic, more than 3 cm wide; posterior rib moderately prominent and not or scarcely naked along sinus; primary lateral veins acutely raised on lower surface, 5 or more pairs; lower blade surface of fresh plant very glossy; plants never visibly infected with fungus. . . . . *A. esmeraldense* Sodiro
            14. Spathe more or less oblong-lanceolate, less than 1.5 cm wide; posterior rib weak and marginal to sinus; lower surface of fresh plants at most semiglossy; all parts of plant infected with fungus pustules. . . . . .*A. herrerae* Croat & P. Huang
         13. Blades with primary lateral veins etched, not at all raised above. . . . . .*A. sp. unknown #1 (Calomystrium)*
      12. Blades conspicuously punctate.
         15. Blades drying grayish. . . *A. sp. unknown #2* (cf. *A. riparium)*
         15. Blades drying dark brown. . . . . .*A. ricaurtense* Croat
   11. Cataphylls persisting as fibers or deciduous.
      16. Blades dark glandular-punctate, with two or more pairs of basal veins extending to the apex and with closely parallel veins interconnecting the basal veins; spadix oblong. . . . . *A. ovatifolium* Engler
      16. Blades epunctate, lacking two or more basal veins extending to the apex and lacking closely parallel veins interconnecting the basal veins; spadix at least slightly tapered.
         17. Blades with basal veins all free to the base.
            18. Blades with many closely-spaced primary lateral veins, drying olive to light brown; spadix sessile.. . . . . *A. longicaudatum* Engler
            18. Blades generally with fewer than 10 primary lateral veins, drying black; spadix usually conspicuously stipitate.. . . . . *A. lancea* var. *ecostatum* Croat
         17. Blades with basal veins united into a posterior rib for at least some distance from the midrib.
            19. Blades with more than 17 pairs of primary lateral veins.
               20. Primary lateral veins raised in valleys on upper surface; blades 70–130 cm long. . . .*A. melampyi* Croat
               20. Primary lateral veins deeply sunken on upper surface; blades 55–70 (–80) cm long. . . . . *A. bernalii* Croat
            19. Blades with primary lateral veins fewer than 12.
               21. Spathe enclosing or prominently hooding the spadix at anthesis, with the spadix turned downward; leaf blades drying dark brown; spadix pink, red or purplish violet at anthesis.

22. Leaf blades with collective veins arising from near the base.. . . . . .*A. benavidesae* Croat
22. Leaf blades with collective veins arising from the uppermost pairs of basal veins or from the primary lateral veins.
23. Spathe narrowly ovate, less than 12 cm long and 5 cm wide, 1.7 times longer than wide, greenish cream outside and hooding spadix; spadix purplish violet, less than 10 cm long, ca. 1 cm wide.. . . . . *A. nestorpazii* Croat & P. Huang
23. Spathe more or less lanceolate, 30 cm long, 9.5–10.5 cm wide, 2.8 times longer than broad, bright red, erect and parallel to spadix; spadix bright red, 30.5 cm long, 3 cm diam. midway when dried. . . . . .*A. protrudens* Croat
21. Spathe not enclosing spadix at anthesis, oblong-lanceolate, ca. 4.8 times longer than broad; spadix yellow-green or medium green to whitish at anthesis. . . . . .*A. versicolor* Sodiro

1. Blades not conspicuously cordate at base.
24. Blades dark glandular-punctate at least on the lower blade surface.
25. Blades usually less than 8 cm long. . . . . .*A. scandens ssp. scandens*
25. Blades usually more than 10 cm long.
26. Stems with internodes much longer than broad.. . *A. pendulispadix* Croat
26. Stems with internodes short, typically broader than long.
27. Leaf blades with two or more pairs of basal veins.
28. Blades ovate to subcordate, 29–53 cmlong, more than 18 cm wide. . . . . .*A. ovatifolium* Engler
28. Blades more or less elliptic, 10–25 cm long, less than 18 cm wide.
29. Primary lateral veins ca. 19 pairs, prominent, inner (complete) collective vein 2–4 mm from the margin. . . . . *A. keatingii* Croat
29. Primary lateral veins 6–8 pairs, not as prominent and scarcely more prominent than interprimary veins, innermost collective vein 6–12 mm from the margin.
30. Leaf blades equilateral and acute at the base, elliptic; outer pair of collective veins running close to the margin from the lower 1/3 of the blade and extending all the way to the apex. . . . . *A. sp. unknown #3*
30. Leaf blades inequilateral and rounded to weakly subcordate at base; outer pair of collective veins merging with the margin in the lower ¼ of blade and not apparently extending to the apex close to the margin; spadix narrowly long-tapered 12.5 cm long (spadix unknown in *A. sp. unknown #4*)
31. Leaf blades less than 16 cm long; collective veins less than 9 mm from margin; second-

ary (outermost) collective vein usually less than 3 cm long before merging with the margin, present only on the subcordate side of blades. . . . . *A. restrepoae* Croat

31. Leaf blades more than 21 cm long; collective veins usually more than 9 mm from the margin; secondary collective veins usually more than 4 cm long before merging with the margins, present on both sides of the blade. . . . . .*A. unknown sp. #4*

27. Leaf blades with one pair of basal veins.
    32. Blades more or less elliptic.
        33. Collective vein 1–2 mm from the margin; inflorescence shorter than or equal to the foliage. . . *A. umbricola* Engler
        33. Collective vein 3–7 mm from the margin; inflorescence significantly exceeding the height of the foliage. . . . . .*A. chucunesense* Croat
    32. Blades oblong to oblong-elliptic.
        34. Inflorescence with spadix very slender and almost needle-like upon drying, narrowly and acutely pointed at apex; flowers ca. 4 mm long in direction of the axis on drying.*A. pazii* Croat
        34. Inflorescence with spadix slender but not at all needle-like upon drying, not narrowly and acutely pointed at apex; flowers 1.3–1.7 cm long. . . . . .*A. lakei* Croat & P. Huang

24. Blades epunctate.
    35. Internodes very short, usually broader than long.
        36. Blades oblong to oblong-elliptic; leaf vernation involute (both margins inrolled in bud). . . . . *A. carchiense* Croat
        36. Blades ovate to subcordate; leaf vernation supervolute (one margin inrolled with the other inrolled around and enveloping it in the opposite direction.
            37. Blades to over 75 cm long, 30 cm wide, much longer than broad. . . . . *A. alluriquinense* Croat
            37. Blades less than 40 cm long, not oblong.
                38. Blades usually at least subcordate, drying olive-green; sinus up to 8 cm deep; primary lateral veins, closely spaced, up to at least 15 pairs. . . . . *A. longicaudatum* Engler
                38. Blades seldom subcordate, drying blackened; sinus seldom exceeding 2 cm deep; primary lateral veins, not closely spaced, fewer than 10 pair. . . *A. lancea* var. *ecostatum* Croat
    35. Internodes usually longer than broad.
        39. Blades more than 12.5 cm wide.
            40. Blades moderately coriaceous, the surface moderately smooth, drying blackened; primary lateral veins arising at 70–80° in the middle of the blade; berries red. . . . . .*A. anchicayense* Croat
            40. Blades moderately thin, the surface somewhat bullate, drying grayish to yellow-green; primary lateral veins arising at 55–60° angle in the middle of the blade; berries greenish. . . . . .*A. membranaceum* Sodiro
        39. Blades less than 12 cm wide.

41. Blades ovate to narrowly ovate, usually less than 2.5 times longer than broad (the narrowest blades of some plants to 3 times longer than broad).
    42. Inflorescences with stipe usually much shorter than the spadix proper; blade drying gray-green to yellow-green on the lower surface;
        43. Leaf blades mostly acute to obtuse or rounded, rarely weakly subcordate at base, mostly abruptly long-acuminate at apex, lower dried blade surface pale grayish yellow, moderately smooth, semiglossy with the tertiary veins mostly obscure, spadix typically long-stipitate, narrowly tapered toward the apex. . . . . .*A. longegeniculatum* Engl.
        43. Leaf blades subcordate at the base, gradually short-acuminate at apex; lower dried lower blade surfaces medium gray-green, matte with the tertiary veins raised; spadix only weakly stipitate, scarcely tapered. . . . . .*A. sp. unknown # 5*
    42. Inflorescences with stipe usually much longer than the spadix proper; leaf blade usually drying yellow-brown gray-green to yellow-green on one or other surface
        44. Leaf blade with the primary lateral veins scarcely easily distinguishable, abruptly long-acuminate at apex. . . . . .*A. gracilistipum* Croat
        44. Leaf blades with primary lateral veind clearly visible on lower surface, usually gradually acuminate at apex. . . . . *A. terracolum* Croat
41. Blades oblong, usually more than 2.5 times longer than wide.
    45. Blades minutely bullate. . . . . .*A. microspadix* Sodiro
    45. Blades not bullate.
        46. Blades drying red-brown, sub- or weakly-coriaceous; spadix orange, maroon, or purple. . . .*A. mindense* Sodiro
        46. Blades drying green, only thinly coriaceous to membranous; spadix greenish.
            47. Leaf blades drying semiglossy on the lower surface; tertiary venation prominently raised on lower surface; collective veins within 2–4 mm of margin. . . . . *A. subcarinatum* Engl.
            47. Leaf blades drying matte on the lower surface; tertiary venation scarcely raised on lower surface; blades with collective vein 4–8 mm from margin. . . . . *A. tenuifolium* Engler

Anthurium alluriquinense Croat, *Aroideana* 31:25–42. 2008. Type: ECUADOR. Pichincha: Along old road from Santo Domingo de los Colorados to Quito via Chiriboga and San Juan, 10.9 km NE of La Unión and Río Pilaton, 00°18′21″S, 78°53′03″W, 1,233 m, 17 Mar 2006, *T. B. Croat, C. Davidson & S. Davidson 95987* (holotype, MO-5971382–3; isotypes AAU, B, COL, F, K, NY, QCNE, US).

Terrestrial; **juvenile plants** with internodes to 8 cm long with petioles 20–25 cm long, terete, narrowly and obscurely sulcate to flattened adaxially, medium green,

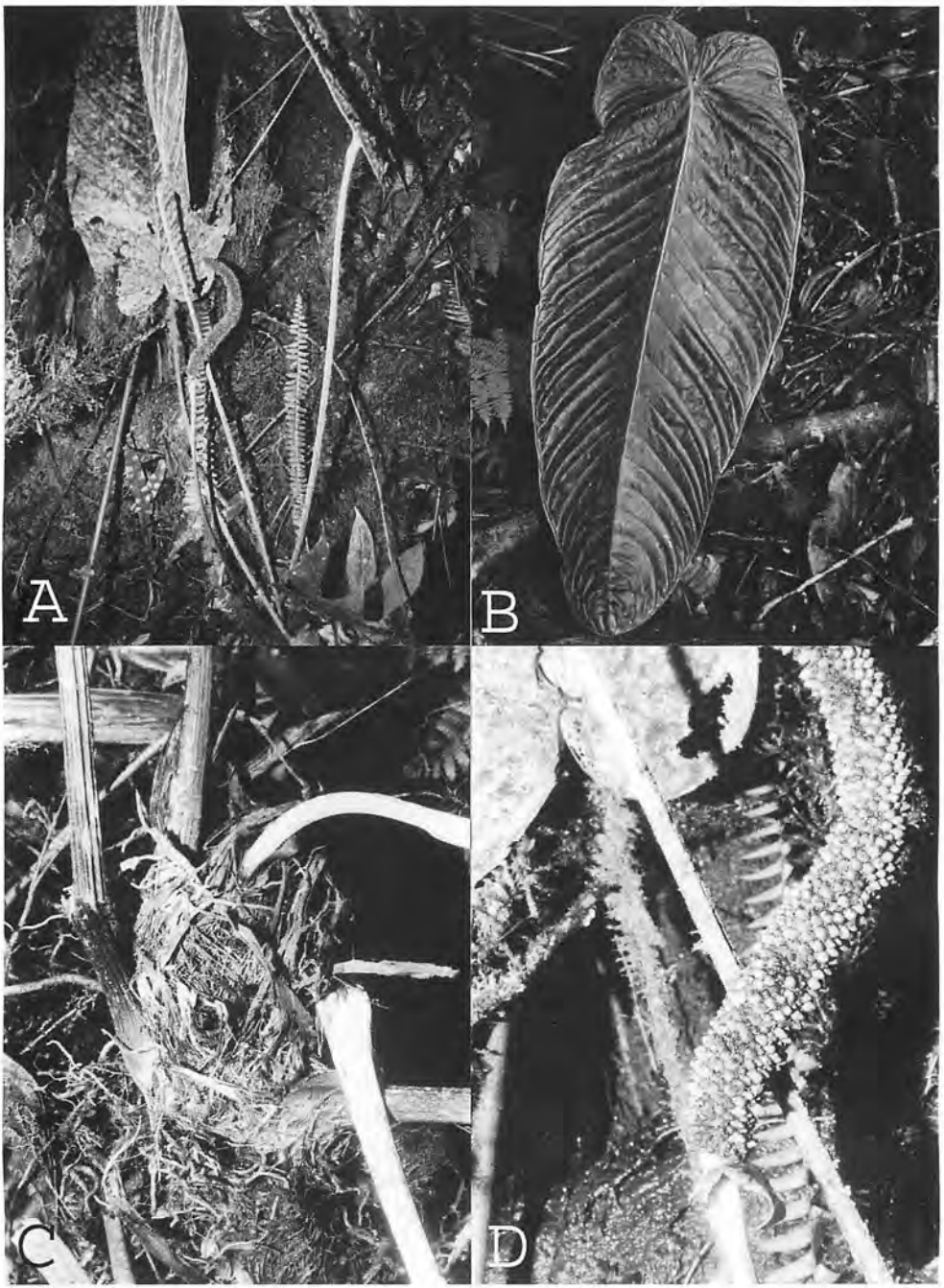

Fig. 1. a–d. *Anthurium alluriquinense* Croat. (*Croat 71584*). a. Habit. b. Leaf blade, adaxial surface. c. Stem showing cataphylls and base of petioles. d. Infructescence showing spadix.

semiglossy; blades 20–30 cm long, 8–11 cm wide; adult **internodes** short 1.8–4 cm diam.; **cataphylls** dark brown, semi-intact at apex, but with loose, semi-organized, red-brown fibers lower on stem, 6–8 cm long; **petioles** 75–107 (–142) cm long (averaging 93.2 cm), 5–8 mm diam. at middle, medium green, weakly glossy, moderately flexible, and many-ribbed circumferentially, sharply C-shaped, sulcate with narrow, bluntly acute-raised margins, many-ribbed circumferentially or sometimes acutely ridged along one side near the base, the opposite side faintly 3-ribbed, semiglossy, medium to dark green, drying light to dark brown; **blades** ovate to narrowly ovate-elliptic to triangular-ovate, caudate-acuminate at apex, 36–58 (–78) cm long, 18–33 (–42) cm wide (averaging 50 × 27 cm), 1.6–2.6 times longer than wide, .4–.8 times as long as petiole, subcoriaceous, dark green and semiglossy to matte-subvelvety above, slightly paler to moderately paler and almost matte to weakly glossy to semiglossy below, subcoriaceous; **anterior lobe** 31–48 (–72) cm long, margins convex; **posterior lobes** 6–10 cm long, 11–14 cm wide, directed inward, often overlapping, directed toward base, 4–10 cm long, 8–13 cm wide; sinus triangular, 2–8 cm deep; **basal veins** 5–7 pairs, normally free to base, on occasion 4th and 5th fused at about 1 cm, all join collective vein; **midrib** narrowly rounded and paler above, convex at base becoming bluntly acute toward apex, round-raised and paler below with marginal acute ribs or many-ribbed below, often acutely 5-ridged below; **primary lateral veins** 13–15 (–20) pairs usually offset, arising at 20–45 (–60)°, slightly to deeply sunken and concolorous above, round-raised to raised knife-like and slightly paler below; **collective vein** arising from lowermost basal vein, 3–4 mm from margin; **tertiary veins** weak and sunken above, some are more obvious below. INFLORESCENCES erect or erect-spreading; **peduncle** (10–) 25–57 cm long, 27 mm diam., dries typically to brown; **spathe** 4.5–8 cm long, 1.0–1.5 cm diam., pale green to almost white, tinged with maroon or purple on inner surface, the margins wavy, sometimes reflexed, usually prominently twisted or undulate along the margins; **spadix** cylindroid, 5–15 cm long, .5–1.2 cm diam., pinkish to dark violet-purple. Flowers 6–8 on primary spiral, 1.5–2.0 mm long, 1.4–1.7 mm wide; the tepals glossy to semiglossy, becoming brownish; **pistils** early emergent. INFRUCTESCENCES 17–24 cm long, 22–27 mm diam. with berries partly emergent; **berries** exserted, ovate, acute at apex, 8–10 mm long, 4–5 mm diam., pointed at apex, bright red in apical 1/2–3/5, white below; seeds greenish white, 4–5 mm long, 3 mm wide, 2 mm thick with a short sticky appendage.

Anthurium alluriquinense ranges from Colombia (Nariño) to Ecuador (Carchi, Pichincha, El Oro) at elevations of 740–1,800 m in *Premontane wet forest*, *Lower montane moist forest*, *Lower montane wet forest* and *Montane wet forest*. It has mostly been collected in Pichincha Province especially on the slopes of Volcán Pichincha. In Colombia it is known only from the area of Ricaurte and at the Río Ñambí near Altaquer. At La Planada it is apparently rare, having been collected only along the trail to El Hondon (except for one specimen with no specific location on label). It must be noted, however, that this trail has not been thoroughly explored due to time constraints; thus, this species may be more abundant in that particular area.

This species is a member of sect. *Polyneurium*. It is characterized by its green-drying, narrowly ovate, subcordate blades with numerous primary lateral veins but especially for its basal veins mostly free to the base, its prominent primary lateral veins which are deeply sunken above and raised knife-like below, and the reddish spathe with frequently broadly-undulate margins and the bright red, stubby spadix with prominently protruding pistils.

Anthurium alluriquinense is most easily confused with *A. longicaudatum*, which differs in having smaller, more ovate blades, more closely spaced primary lateral veins, and less prominent basal lobes. This species holds considerable similarity to a number of other species of sect. *Polyneur-*

ium from Ecuador and Colombia, but differs from each in one or more important aspects. *A. cordulatum* and *A. cuspidiferum* both have blades with obtuse rather than than subcordate bases and long, tapered spadices. *A. oreophilum* also differs in having a long, tapered spadix, and also has blades considerably more ovate than those of *A. paucinervium*. *A. praealtum* has very similar blades, but again has a much longer, more tapered inflorescence.

Additional specimens seen: COLOMBIA. **Nariño:** Ricaurte, Tumaco-Tuquerres road, W of Junín, 900 m, 25 Nov 1981, *Gentry 34963* (MO, PSO); Along trail to El Hondón beginning at Quebrada El Tejón, 01°06'N, 77°53'W, 1,800 m, 19 Mar 1990, *Croat 71584* (CHOCO, HUA, MO, PSO); 01°08'N, 77°54'W, 780–800 m, 15 Mar 1990, *71489* (MO, PSO); 01°18'N, 78°04'W, 1,100–1,130 m, 20 Mar 1990, *71645* (MO, PSO); 01°05'N, 78°01'W, 7 Jan 1988, *Gentry et al. 60559* (MO, PSO). ECUADOR. **Carchi:** El Chical-. .6 km W of bridge over Río Chical 1,350 m, 00°59'01"N, 78°11'37"W, 1,350 m, 8 Aug 2004, *Croat & G. Ferry 93091* (MO, QCNE); 9 Aug 2004, *Croat & G. Ferry 93108* (MO, QCNE); El Pailon, ca. 45 km below Maldonado along a foot path to Tobar Donoso, 800 m, 29 Nov 1979, *Madison & Besse 7182* (SEL).

Anthurium anchicayense Croat, *Aroideana* 26:2–4. 2003. Type: COLOMBIA. Valle: 20 km W of Borrera Ayerbe, 7 km W of El Salado, off old Cali-Buenaventura Road, 28 km W of junction with new Cali-Buenaventura Highway, 03°33"10'N 76°45"45'W, 1,400–1,420 m, 28 Aug 1976, *Croat 38632* (holotype, MO-2395616; isotypes B, COL, F, JAUM, K, NY, US).

Terrestrial, semi-erect; internodes 3–14 cm long, .8–1.8 cm diam., matte, medium green to gray-green, becoming gray-brown, drying dark brown. LEAVES with **petioles** 16–20 cm long (averaging 18.5 cm), subterete, bluntly sulcate, weakly swollen at geniculum; **blades** elliptic, 26–43.5 cm long, 12.5–20 cm wide (averaging 37.6 × 16.8 cm), 2.1–2.2 cm times longer than wide, 1.9–2.3 times longer than the petioles, subcoriaceous, matte to weakly glossy, subvelvety and dark green above, moderately paler and semiglossy below, drying to dark brown above and significantly paler below; midrib convex and more or less concolorous above, narrowly convex and weakly 3-ribbed below; **primary lateral veins** flat to weakly quilted above, departing midrib at (60–) 70–80°, individually scarcely visible above, more conspicuous and round-raised below, collective vein arising from one of the first primary lateral veins, .6–1.8 cm from margin. INFLORESCENCE erect; peduncle terete, 13–36 cm long; **spathe** 6.5–12 cm long, 6–12 mm wide, medium green, drying to dark brown, lanceolate, spreading at 90° angle or prominently reflexed; **spadix** 19–25 cm long, slightly tapered, 4–5 mm diam. at base, 3–4 mm near middle, 2–3 mm at apex, nonstipitate, green to yellowish green (turning brown in age), matte. Flowers rhombic, 2–4 visible per principal spiral, 2.1–3.8 mm long, 1.3–2.9 mm wide, sides straight, lateral tepal 1.9–2.2 mm long, .4–.8 mm wide; anthers yellow. INFRUCTESCENCES with **berries** red at maturity, blunt at apex, broader than long, ca. 4 mm long; seeds 1 per locule, greenish, ca. 2 mm long, 15 mm diam.; mesocarp clear, gelatinous, sweet.

Anthurium anchicayense is known only from Colombia on the western slopes of the Cordillera Occidental from (250–) 1,100 to 1,450 m in elevation, in Valle and Nariño Depts. It is to be expected in adjacent Ecuador in Carchí. In Nariño it occurs in an area of *Premontane wet forest*. The species occurs in dense understorey in full shade near streams. Flowering collections were made in December and in late March.

Anthurium anchicayense is characterized by its elongate internodes and the broadly elliptic, dark-brown drying blades with inconspicuous primary lateral veins. This species is apparently related to *A. guayaquilense* differing from the latter in being subvelvety rather than semiglossy on the upper blade surface, in having blades elliptic rather than generally oblanceolate, and in having veins departing the midrib at

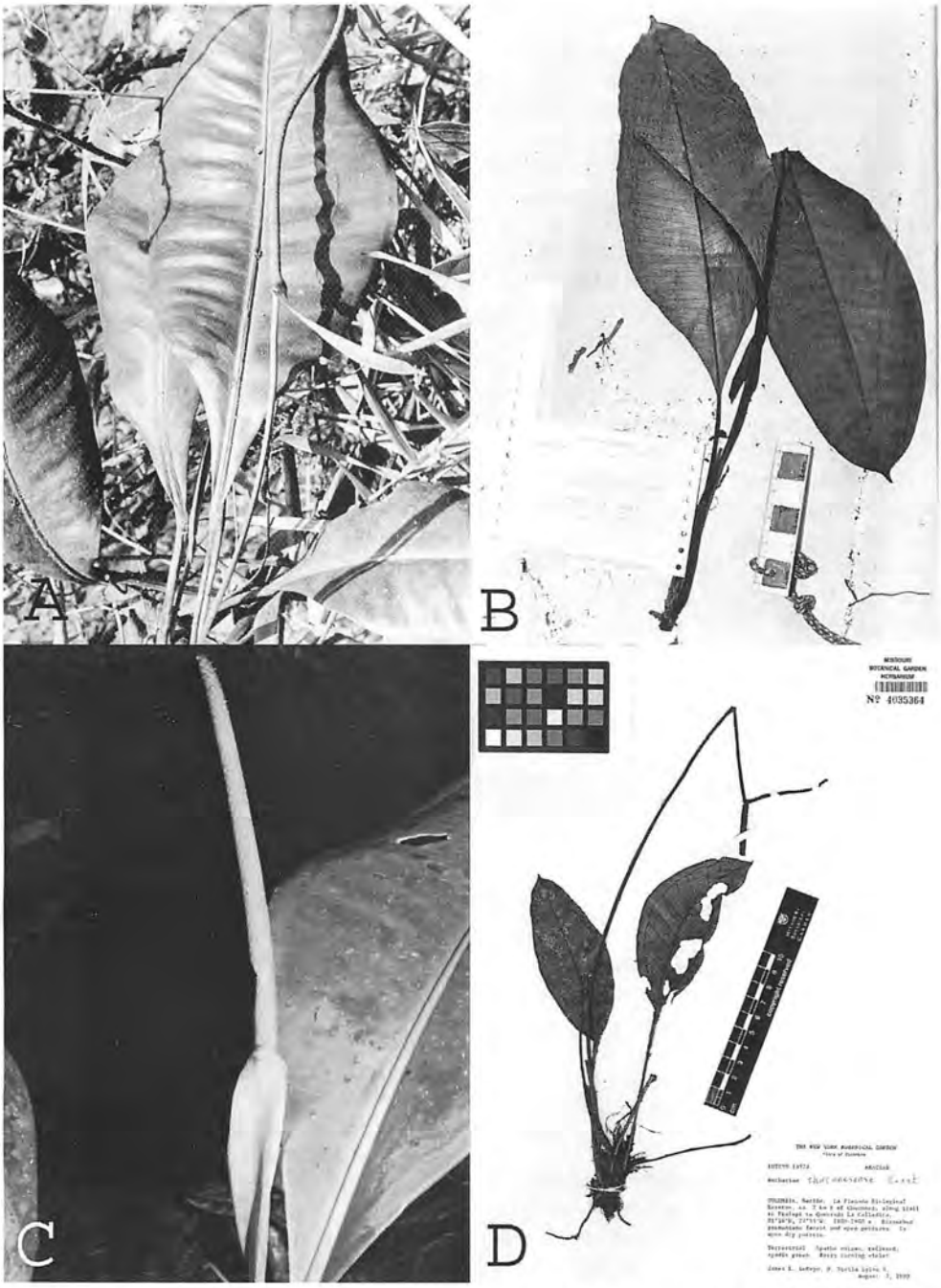

Fig. 2. a–c. *Anthurium anchicayense* Croat. a. Habit. (*Croat 38632*). b. Herbarium specimen showing leaf blade. (*Herrera 9667*). c. Inflorescence showing spathe and spadix. (*Croat 71665*). d. *Anthurium chucunesense* Croat. (*Luteyn 13922*). d. Herbarium specimen.

usually a 70–80° angle rather than at a 40–50° angle. *Anthurium guayaquilense* occurs also in Valle del Cauca in the same general region but the two species have never been found together and *A. guayaquilense* occurs from sea level to 100 m, whereas *A. anchicayense* occurs from 250 to 1,400 m.

Additional specimens seen COLOMBIA. **Narino**: La Planada, 01°09′37″N, 077°59′13″W, *G. Herrera 9667* (PSO); Barbacoas, Corregimiento de Junín, 01°39′21″N, 078°09′55″W, 1,200 m, 5 Dec 1986, *Benavides 7636* (MO, PSO); Río Ñambí: Corregimiento Altaquer, Vereda El Barrol°18′N, 78°08′W, 1,325 m, 4 Dec 1993, *J. Betancur et al. 4515* (MO); *4698* (COL, MO); 01°18′N, 78°08′W, 1,325 m, 1 Dec 1993, *P. Franco et al. 4712* (COL); 7 Dec 1993, *5007* (COL), *5033* (COL); Between Altaquer and Junín, 7 km W of Altaquer, Río Ñambí, 1°18′N, 78°04′W, 1,100 m, 21 Mar 1990, *Croat 71665* (MO, PSO); San Isidro, Las Cruces, Cabeceras Hondonadas de Quebrada que dan a Corcuel, 01°10′18″N, 78°00′09″, 1,600 m, 5 Jun, 1997, *G. Herrera & J. Bittner 9667* (PSO). ECUADOR. **Carchi**: Vicinity of Peñas Blancas, 6.6 km N of El Chical along trail to Tobar Donoso, 00°58′38″N, 078°11′53″W, 1,100 m, 18 Feb 2005, *Croat, C. & S. Davidson 94925* (MO, QCNE).

Anthurium benavidesae Croat **sp. nov.**

Type: COLOMBIA. Nariño: La Planada Reserve, 7 km from Chucunés, cloud forest, 01°05′N, 78°01′W, 1,800–1,850 m, 4 Jan 1988, *A. Gentry, O. de Benavides & P. Keating 60366* (holotype, MO-3636083-88; isotype, PSO).

Internodia brevia, ad 5 cm; cataphylla ad 20 cm longa, persistens in fibris tenuibus; petiolus 60–168 cm longus, 8–12 mm diam.; lamina ovato-sagittata, 46–125 cm longa, 28–84 cm lata; spatha cremeus, 25 cm longa, 11 cm lata; spadix roseus, ca. 24 cm longus, 35 mm diam. ad basim.

Epiphytic, usually appressed; **internodes** short, to 5 cm diam.; **cataphylls** to ca. 20 cm long, reddish brown, persisting as closely parallel tan fibers with tiny fragments of epidermis, remaining semi-organized for much of the length of the stem; **petioles** 60–168 cm long (averaging 116 cm), 8–12 mm diam. at middle, firm, terete, sometimes weakly sulcate, medium green, semiglossy, drying dark brown, smooth, terete, matte, slightly folded longitudinally; geniculum 2–3.5 cm long, scarcely visible on drying, slightly shrunken; **blades** ovate-sagittate, acuminate at apex, conspicuously sagittate at base with the lobes turned inward prominently and overlapping, 46–125 cm long, 28–84 cm wide (averaging 76 × 55 cm), 1.1–1.6 times longer than wide (averaging 1.32), .44–.94 times as long as petioles, moderately coriaceous, dark green and semiglossy above, moderately paler and almost matte below; margins sometimes undulate; **anterior lobe** 33–102 cm long, averaging 59.3 cm, broadly rounded along margins; **posterior lobes** 15–44 cm long, 11.3–32 cm wide; **sinus** closed, broader than long, 13.5–35 cm deep; **midrib** narrowly rounded and slightly paler above, narrowly rounded and moderately paler below; **basal veins** 7–9 pair, 1st (2nd) free to the base, the remainder variously coalesced for 13–18.5 cm, 5–6 of these acroscopic, 2–3 basiscopic; **posterior rib** prominent, markedly curved, naked for 13–18.5 cm, **primary lateral veins** surfaces markedly quilted, 5–7 per side, departing midrib at 45–50° angle, ascending to collective vein, bluntly acute and slightly paler in deep valleys above, acute and paler below, drying acute and concolorous above, acute and darker below; **tertiary veins** moderately obscure, in part darker than surface, mostly not raised upon drying; **collective veins** originating from one of lowermost basal veins, 2–5 mm from margin, drying etched on upper surface, narrowly raised on lower surface. INFLORESCENCES erect-spreading; **peduncle** round, short at anthesis, elongating to 47 cm long in fruit; **spathe** greenish cream outside, pink inside, 25 cm long, 11 cm wide, partly wrapped around spadix, drying brown; **spadix** pink turning rotten red, or bright red, pendulous, tapered, weakly stipitate, ca. 24 cm long, 35 mm diam. at base,

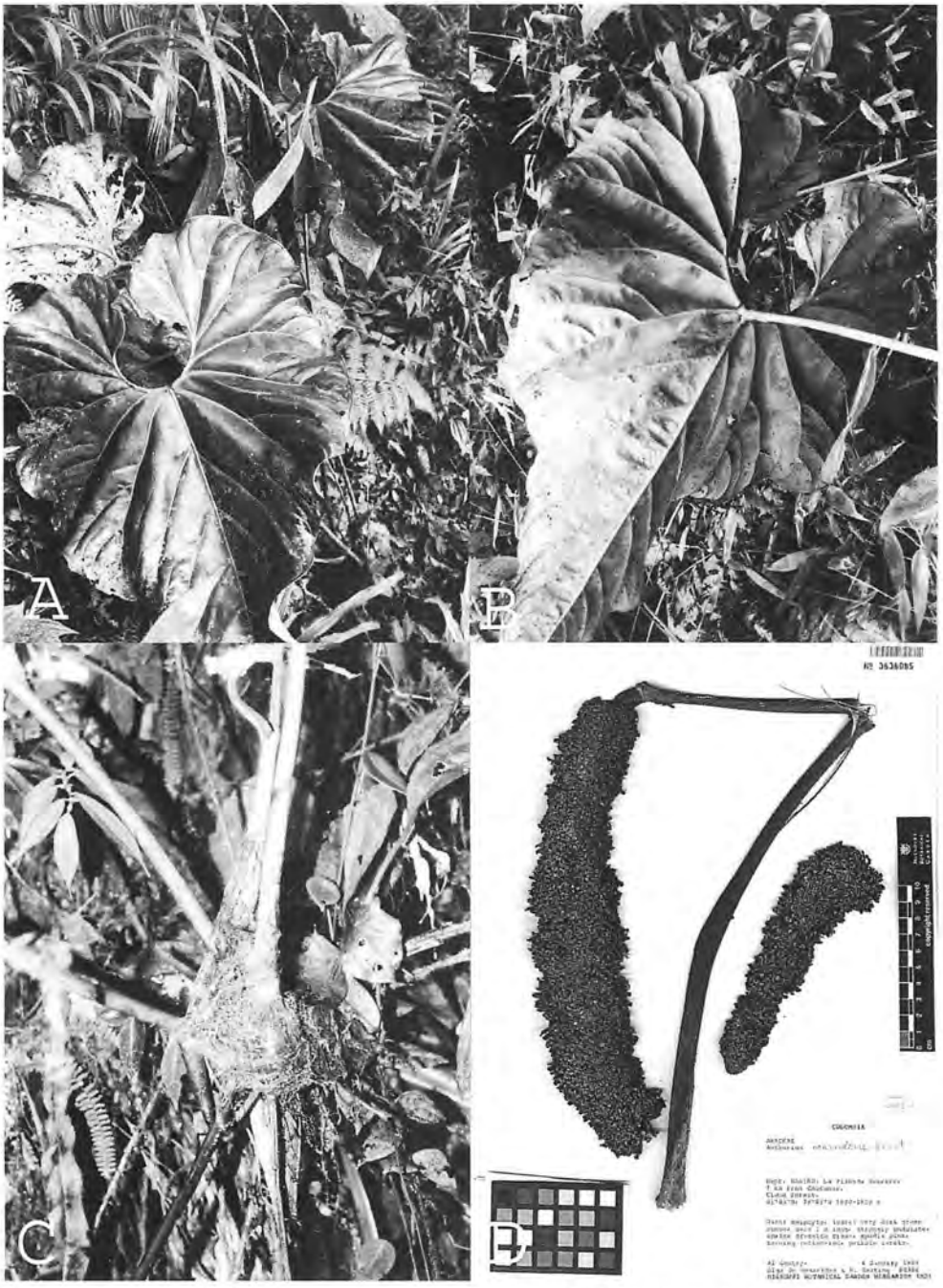

Fig. 3. a–d. *Anthurium benavidesae* Croat. (*Croat 71236*). a. Habit. b. Leaf blade, abaxial surface. c. Stem showing cataphylls and base of petioles. d. Herbarium specimen showing infructescence. (*Gentry 60366*).

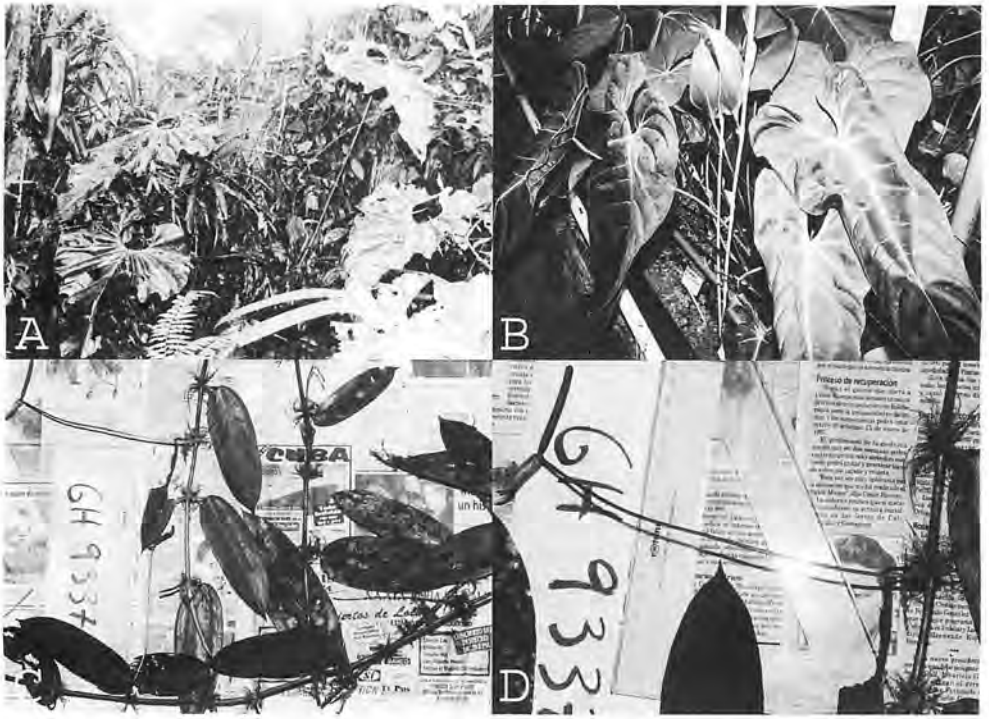

Fig. 4. a. *Anthurium benavidesae* Croat. (*Croat 71236*). a. Habit. b. *Anthurium esmeraldense* Sodiro. (*Croat 74033*, Cultivated at Anthura Inc, 90-10-77). b. Habit of cultivated plant. c–d. *Anthurium gerherrerae* Croat. (*G. Herrera 9337*). c. Fresh, unmounted specimen showing stem and leaves. d. Fresh, unmounted specimen showing inflorescence.

27 mm diam. at middle, 11 mm diam. at 1 from apex. Flowers 23–25 visible per spiral, 2.4–2.6 mm long and wide; tepals drying dark brown, conspicuously sparsely warty on outer surface, smooth on inner surface; lateral tepals 1.2–1.6 m wide, the outer margin 2-sided, the inner margin rounded, mostly held stiffly erect at least upon drying with all of the tepals together forming a tube with the pistil apex fully exposed; style 1.2–14 mm diam., circular and appear to be completely bisected by the slender sunken stigma. INFRUCTESCENCES to ca. 45 cm long, 6 cm diam., with stipe ca. 2 cm long; **berries** red, mostly overtopped by the tepals in dried condition.

Anthurium benavidesae is known only from the type locality at La Planada in Colombia (Nariño) at elevations of 1,750–1,950 m, in a *Premontane wet forest* life zone.

The species is a member of sect. *Belolonchium*, and is recognized by its short internodes, persistent reddish brown cataphyll fibers, the large ovate-sagittate blades with prominently incurved posterior lobes and with 7–9 pairs of basal veins, the markedly curved, naked posterior rib, the relatively few primarily lateral veins (5–7), the collective veins arising from the lowermost basal veins, and large inflorescence with the greenish cream spathe partially enclosing the pinkish spadix. Especially noteworthy is the strange tepals which are held in a tube around the pistil.

Anthurium benavidesae is similar to the poorly known *A. chamberlainii*, a species of unknown origin and which is known only from the original cultivated collection and drawing. That species was suspected to have been collected in Venezuela because

it was discovered in imported material of *Cattleya gaskelliana*. *Anthurium chamberlainii* differs from *A. benavidesae* in having the spathe to 20 cm long with the color described as pale, dull puce-colored externally, shining and rich deep crimson internally, bordered by a very narrow line of ivory-white, edged in turn by a narrow margin of yellow. In addition the spathe is merely concave, not the least bit wrapped around the spadix. In contrast the spathe of *A. benavidesae* is larger (24 cm long) and is wrapped somewhat around the spadix beginning to enclose it and it is greenish cream. *Anthurium chamberlainii* has a spadix 15 cm long and 2 cm diam. whereas *A. benavidesae* has a spadix about 24 cm long and 3.5 cm diam. In addition *A. chamberlainii* has the collective veins arising from the first pair of basal veins whereas *A. benavidesae* has the collective vein originating from one of lowermost basal veins and courses to the apex 2–5 mm from margin.

Anthurium benavidesae is also similar to *A. gualeanum*, differing from that species primarily in having only a half to a third as many primary lateral veins as *A. gualeanum*. In addition *A. gualeanum*, known largely from central Ecuador on the western slopes of the Andes, has a spathe that completely surrounds the spadix at anthesis.

The species is named in honor of Dr. Olga de Benavides who, along with Al Gentry and Phillip Keating, collected the type specimen. Benavides, then Curator of the Herbarium at the Universidad del Nariño in Pasto was instrumental in the creation of the La Planada Reserve and was among the first persons to study the plants there.

Paratypes: COLOMBIA. **Nariño:** Ricaurte, La Planada, 7 km above Chucunés (on road between Tuquerres and Ricaurte), along Sendero Vieja, along ridge top in direction of La Piña, 01°06′N, 77°54′W, 1,950–2,010 m, 9 Mar 1990, *Croat 71236* (MO, PSO); Trail "La Pina" to Mirador, 01°09′37″N, 77°59′13″W, 1,850 m, 18 Jul 1996, *Bittner 2627* (MO, PSO).

Anthurium bernalii Croat **sp. nov.** Type: COLOMBIA. Nariño: La Planada, 7 km above Chucunés, on the road between Tuquerres and Ricaurte, in regrowth secondary forest, with elements of primary forest, and along the trail above La Posada, 01°05′N, 78°01′W, 1,780 m, 26 July 1988, *T. B. Croat 69573* (holotype, MO-6063781–83; isotypes, AAU, B, COL, CUVC, F, G, GB, HUA, K, M, NY, QCNE, PSO, RB, S, SEL, UB, US).

Internodia ad 5 cm longa; cataphylla persistens in fibris; petiolus 70–100 cm longus, teres; lamina subcoriacea, ovato-triangularis, cordata, 55–70 cm longa, (11.3–) 27–44 cm lata, bullata; nervis primariis lateralibus (20–) 25–30 utroque; spatha ca. 12–13 cm longa, 1 cm lata, viridis, interdum suffusa rubra; spadix ca. 22.5–34 cm longa, 5 mm diam., purpureus en anthesis.

Terrestrial as juvenile or preadult, usually epiphytic as adult; **juvenile plants** with **petioles** 15–20 cm long, 1–2 mm diam., **blades** ovate-triangular, slightly to moderately cordate, 15–20 cm long, 5–9 cm wide; **adult plants with internodes** to 5 cm long, 1.5–4 cm diam.; **cataphylls** persisting intact at upper nodes, as linear bases of fibers at lower nodes, 12–16 cm long, drying medium tan; **petioles** 70–100 cm long (averaging 73.3 cm), 4–7 mm diam. at middle, terete, sometimes tinged maroon; **blades** ovate-triangular, acuminate at apex, cordate at base, (25–) 55–81 cm long, (11.3–) 27–44 cm wide (averaging 72.2 × 35.6 cm), 1.8–2.2 times longer than broad, .8–1.0 times longer than the petioles, broadest at or slightly above point of petiole attachment (sometimes broadest below the petiole attachment), subcoriaceous; surfaces slightly bicolorous, drying medium olive; upper surface semiglossy and bullate; lower surface matte; **anterior lobe** 33–65 cm long, broadly convex to slightly concave along the margin; **posterior lobes** 13–21 cm long, 12–20 cm wide, directed either inward or outward; **sinus** spathulate to parabolic, 7–10 cm deep, 5–9 cm wide; **midrib** convex and paler than

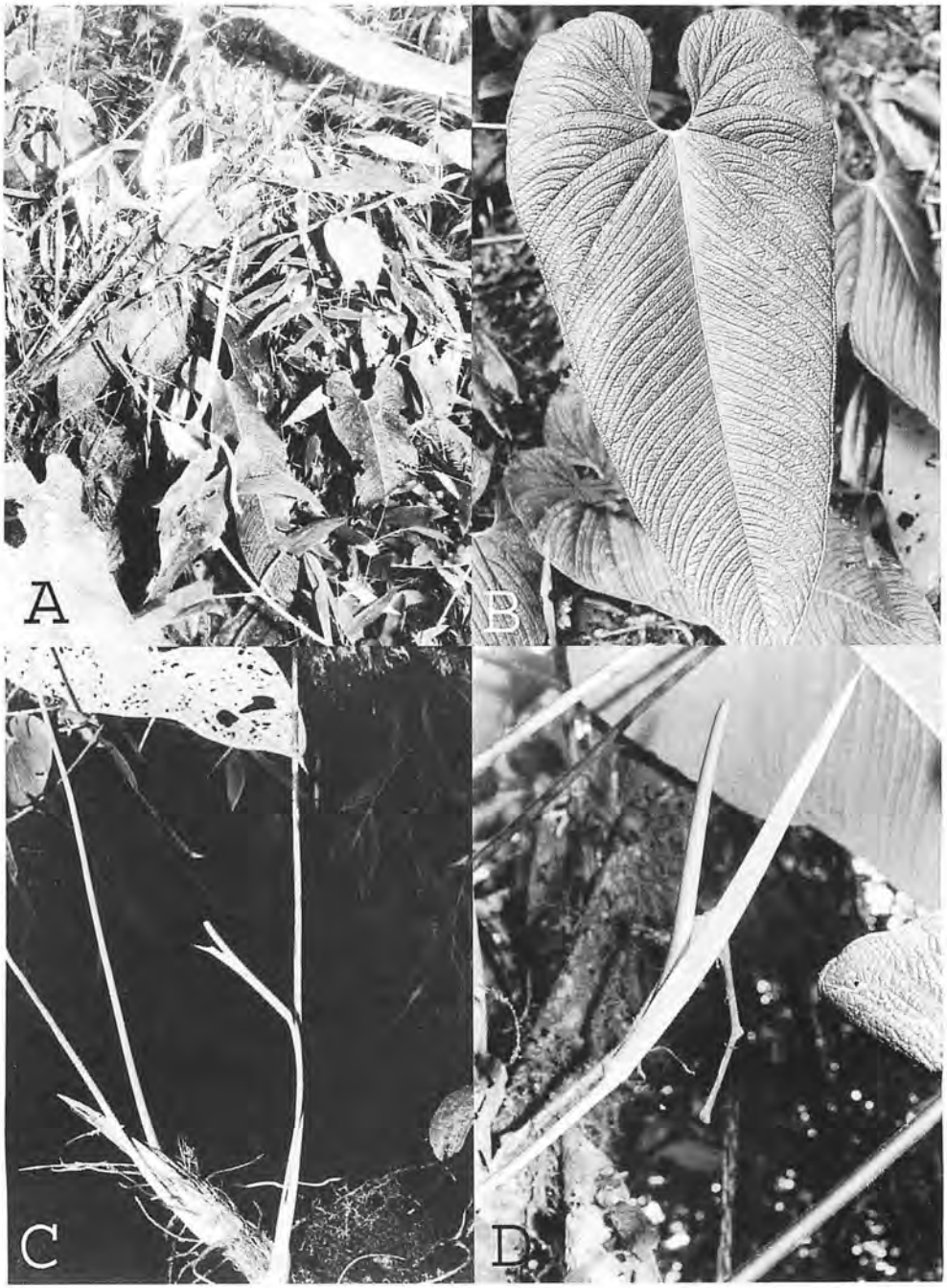

Fig. 5. a–d. *Anthurium bernalii* Croat. (*Croat 69573*). a. Habit. b. Leaf blade adaxial surface. c. Stem showing cataphylls, base of petioles and inflorescense. (*Croat 71328*). d. Inflorescence showing spathe and spadix. (*Croat 69573*).

surface above, round-raised and paler than surface below; **basal veins** 6–7 pairs, first one or two free to base, the remainder coalesced for 2–3 cm; **posterior rib** naked for 1–2 cm; **primary lateral veins** (20–) 25–30 per side, sunken above, raised below; **interprimary veins** nearly as conspicuous as primary lateral veins; **collective vein** arising from one of basal veins, 2–5 mm from margin; **all other veins** prominently sunken above, prominently raised below. INFLORESCENCES erect-spreading; **peduncle** 30–55 (–70) cm long, 3–5 mm diam. at middle; **spathe** lanceolate, 12–13 cm long, 1 cm wide, green, reddish green, or light green; **spadix** green or brownish green, becoming purplish before anthesis, weakly glossy, narrowly tapered, 22.5–34 cm long, 5 mm diam. near middle, 3.5 mm diam. at 1 cm from apex. Flowers visible 5–7 per spiral, 2.3–2.5 mm long, 1.7–1.9 mm wide; tepals minutely granular, lateral tepals 1.0–1.3 mm wide, the outer margins 3–4 sided (shield-shaped); pistils green, acute, early emergent. INFRUCTESCENCES to 40 cm long, moderately dark green; tepals green in early fruit.

Anthurium bernalii is now known only from Colombia (Nariño) and adjacent Ecuador (Carchi), at elevations of 1,450–2,390 m, in *Premontane wet forest.*

A member of sect. *Polyneurium*, this species is recognized by its moderately short internodes, the persisting fibrous cataphylls, terete petioles and especially by the conspicuously bullate, ovate-triangular blades as well as by its long, slender green spadix which turns purple before anthesis. It is apparently quite frequent at La Planada, having been collected several times by different botanists throughout the Reserve.

Anthurium bernalii is perhaps closest to *A. pulverulentum*, another terrestrial member of sect. *Cardiolonchium* at La Planada. That species differs in having longer internodes which are transversely fissured, cataphylls which are more than 30 cm long, petioles that are several ribbed adaxially and a bluish green spadix.

Croat 71328 is similar to *A. bernalii* but differs in having a thinner blade with the margins conspicuously convex with the collective veins much closer to the margin. Its blades are considerably more ovate than most of the rest of the specimens, and its spadix is described as being a deep purple, a color not generally fitting the other material. This specimen raises questions concerning the actual color progression of the spadix, which is not yet well known. *Benavides 9699* collected between El Mar and La Calladita at 1°10′N, 77°58′W, on April 30, 1988 is the same as *Croat 71328* These two collections probably represent another new species.

The species was first collected by Al Gentry in November 1981. It is named in honor of Colombian botanist Rodrigo Bernal who, along with Barry Hammel, made the second collection at La Planada in 1986. Rodrigo, a specialist with Bromeliaceae, has collected many interesting and new species of Araceae in Colombia.

Paratypes: COLOMBIA. **Nariño:** Ricaurte, La Planada, Salazar Finca 7 km above Ricaurte, 01°08′N, 077°58′W, 1,750 m, 26 Nov 1981, *Gentry 35048A* (MO, PSO); Tuquerres - Ricaurte, 7 km above Chucunés (on road between Tuquerres and Ricaurte), along Sendero La Vieja to "La Pina", 1°06′N, 77°54′W, 2,010–2,060 m, 11 Mar 1990, *Croat 71328* (MO, PSO); 01°10′N, 077°58′W, 1,800 m, 1 Nov 1987, *Benavides 8674* (COL, MO, PSO); 14 Nov 1987, *8884* (MO, PSO); 26 Sep 1989; *10889* (PSO); 29 Apr 1988, 2 Nov 1987, *8815* (PSO); 17 Jan 1990, *11200* (PSO); 26 Sep 1989, *10859* (PSO); *10889* (PSO); *Gentry & Benavides 55025* (PSO); Isla de Osos, 1 May 1988, *Benavides 9724* (PSO); El Mar-La Calladita, 1°10′N, 77°58′W,1,500–1,800 m, 29 Apr 1988, *Benavides 9603* (PSO); Near Ricaurte, 01°05′N, 78°01′W, 1,800 m, 21 Dec 1987, *Gentry, Benavides & P. Keating 59659* (MO, PSO); Município de Ricaurte, 5 km S of Cuayquer, 1°10′N, 78°00′W, 1,750 m, 22 Nov 1986, *B. Hammel & R. Bernal 15798* (MO, PSO); 01°05′N, 78°01′W, 7 Jan 1988, *Gentry, Benavides & P. Keating 60531* (MO, PSO). ECUADOR. **Carchi:** Espejo, Reserva

Golondrinas, El Corazón, Recorrido por el sendero a La Cortadera hasta El Mirado, 00°50′N, 78°06′W, 2,390 m, 23 Jan 2004, *Homero Vargas et al. 4340* (MO, QCNE).

Anthurium carchiense Croat, *Ann. Missouri Bot. Gard.* 78(3):621–2. 1991. Type: ECUADOR. Carchi: vic. Maldonado, 00°54″00′N, 78°06″00′W, 1,500–1,900 m, 27 Jan 1979, *Madison 3998* (holotype, SEL-027098; isotype, MO-2925092).

Terrestrial or epiphytic; **internodes** mostly short, rarely to 1.5 cm long, .5–3 cm diam.; **roots** numerous, drying light tan; **cataphylls** drying reddish brown when intact, tan as fibers, persisting as closely parallel or loosely reticulate fibers; **petioles** (11–) 27–32 cm long (averaging 23.7 cm), 2–5 mm diam. upon drying, erect, terete to triangular or D-shaped, obscurely and narrowly sulcate when young, narrowly rounded abaxially when mature, sharply flattened adaxially with sharp erect margins; geniculum slightly paler and thicker than petiole; **blades** oblong-elliptic, broadly acuminate at apex, acute at base, 29–58(68) cm long, 5.5–12 (–18) cm wide (averaging 50.2 × 10.2 cm), broadest at or near middle, subcoriaceous; upper surface dark green and almost matte; lower surface slightly paler and semiglossy; **midrib** convex when young, broadly flattened in age, scarcely paler above, acute and slightly paler below; **primary lateral veins** 13–18 per side, departing midrib at 60°–75° angles, scarcely raised above, flat and darker than surface below; **interprimary veins** nearly as conspicuous as primary lateral veins; **collective vein** arising from one of lowermost primary lateral veins, 7–10 mm from margin; INFLORESCENCES erect-spreading; **peduncle** 10–50 cm long, 3–8 mm diam.; **spathe** green, erect-spreading to reflexed, oblong-lanceolate, less than 8 cm long; **spadix** dark purple, oblong, erect, 5–8 cm long, 3–5 mm wide; pistils weakly protruding. INFRUCTESCENCES with **spadix** 14 cm long, 13 mm diam. dried; **berries** early emergent, orange-red at maturity, narrowly ovate, acute at apex.

Anthurium carchiense is found in Colombia (Nariño) and Ecuador (Azuay, Carchi, Esmeraldas, Guayas, Imbabura, Los Ríos, Manabí, Pichincha) at elevations of 550–2,600 m in *Premontane rain forest*, *Premontane wet forest* and *Premontane dry forest* life zones.

A member of sect. *Pachyneurium*, ser. *Multinervium*, this species is recognized by its terrestrial habit, short, densely rooted stems, more or less oblong-oblanceolate blades with obscure primary lateral veins and by its short, stubby, purplish spadix. As the only member of sect. *Pachyneurium* in the Flora, it is the only species with involute vernation. The La Planada material of this species, however, was at variance with the type in having nearly matte blade surfaces instead of the typically glossy surface and in having rounded rather than acute upper midribs.

Anthurium carchiense is most easily confused with *A. obscurinervium* Croat which occurs on the western slopes of the Andes in Ecuador. That species differs in having a green spadix, D-shaped petioles and purplish to purplish-black berries.

Additional specimens examined: COLOMBIA. **Nariño:** Barbacoas, Río Ñambí, Corregimiento Altaquer, Vereda El Barro 01°18′N, 78°08′W, 1,325 m, 4 Dec 1993, *Franco, P. et al. 4867* (MO); 01°18′N, 78°08′W, 1,325 m, 2 Dec 1993, *P. Franco, D. Giraldo, W. Beltrán, A. Prieto & O. Rivera 4735* (MO); *J. Pipoly et al. 21371* (PSO); 01°09′37″N, 77°59′13″W, 1,850–1,950 m, 19 Jun 1996, *Bittner et al. 2557* (MO, PSO); 01°09′37″N, 77°59′13″W, 1,850–2,000 m, 21 Jun 1996, *2591* (MO, PSO); 01°09′37″N, 77°59′13″W, *2624* (PSO); 01°09′37″N, 77°59′13″W, *2623* (PSO); Salazar Finca 7 km above Ricaurte, 01°08′N, 77°58′W, 1,750 m, 29 Nov 1981, *Gentry 35197* (COL, MO); La Posada, 01°05′N, 78°01′W, 1,780 m, 26 Jul 1988, *Croat 69571* (AAU, CAS, COL, CM, K, MEXU, MO, NY, PSO, QCA, SEL, US, VEN); Corregimiento de Chucunés, Vertiente Occidental, 01°10′00″N, 77°58′00″W, 1,800 m, 2 Aug 1992, *N. Paz, 304* (CUVC,

Fig. 6. a–c. *Anthurium carchiense* Croat. (*Croat 69571*). a. Habit. b. Early stage inflorescence showing spathe and spadix. c. Late stage inflorescence showing spathe and spadix. d. *Anthurium gracilistipum* Croat. (*Croat 69637*). d. Stem showing leaves and infructescence.

MO); 01°10′N, 77°58′W, 1,800 m, 15 Nov 1987, *Benavides 8908* (MO, PSO); 27 Sep 1989, *10944* (PSO); 17 Jan 1990, *11223* (PSO); 01°10′00″N, 77°55′00″W, 1,800 m, 1 Apr 1992, *Restrepo 507* (MO, PSO); Near Ricaurte, 01°05′N, 78°01′W, 1,800 m, 21 Dec 1987, *Gentry et al. 59681* (MO, PSO); 18 Feb 1994, *Humberto Mendoza 537* (PSO); Trail from Las Cruces to Curcuel, 1°08′N, 77° 51′W, 1,700–1,800, 5 Nov 1995, *B. R. Ramírez P et al. 8586* (PSO); Resguardo Indigena Gualcalá, Santa Fé, trail to Río Gualacalá, 1°18′N, 77°54′, 1,100–1,200 m, *B. R. Ramírez P. & M. S. González 9197* (PSO); ECUADOR. **Carchi:** Trail from Rafael Quindís mountain finca to Río Verde and short distance up Río Verde, 00°52′N, 78°8′W, 1,890 m, 28 Nov 1987, *W. S. Hoover & S. Wormley 1875* (MO, QCA); Rafael Quindí's mountain finca, 00°52′N, 78°7′W, 1,870–2,400 m, 3 Dec 1987, *W. S. Hoover 2265* (MO); Embankments along Río Verde, 00°52′N, 78°8′W, 1,890 m, 29 Nov 1987, *W. S. Hoover 1986* (MO); Chical, 00°56′N, 78°11′W, 1,200–1,250 m, 08 Aug 1983, *Thompson & Rawlins 995* (CM); Quebrada Peñas Blancas - Quebrada Quinchul, 00°58′N, 78°12′W, 10 Aug 1983, *1031* (CM); Maldonado, 1,800 m, *Madison 4264* (SEL); Awá Encampment: SE Trail, Gualipí Chicó area, 00°58′N, 78°16′W, 1,330 m, 18 Jan 1988, *W. S. Hoover et al. 2752* (MO); Gualpí Chico, 00°58′N, 78°16′W, 1,330 m, 15 Jan 1988, *3212* (MO); Río San Juan, Environs of Chical, 00°56′36″N, 78°11′17″W, 1,200 m, 29 May 1978, *M. T. Madison et al. 4672* (K, MO, SEL); Chical 12 km below Maldonado, 01°4′N, 78°17′W, 1,200 m, May 1978, *M. T. Madison et al 4812* (SEL).

Anthurium chucunesense Croat **sp. nov.**

Type: COLOMBIA. Nariño: La Planada Biological Reserve, ca. 7 km S. of Chucunés, along trail to Pialapi to Quebrada La Calledita, 01°10′N, 77°55′W, 1,800–1,900 m, disturbed premontane forest and open pastures, in open dry potrero, 7 Aug 1990, *J. L Luteyn & D. Stella Sylva S. 13922*, (holotype, MO-4035364; isotype, PSO).

Internodia brevia, 7 mm diam.; cataphylla 4 cm longa, persistens in fibris; petiolus 9–11 cm longus, 2 mm diam.; lamina elliptica vel ovato-elliptica, 10–12 cm longa, 4–5 cm lata; nervis primariis lateralibus 5–6 utroque; pedunculus 35 cm longus, 1–2 mm diam.; spatha marroninus, 5 cm longa, 4 mm lata; spadix viridis, debiler stipitatus, 16 cm longus, 4 mm diam. prope basim, 2 mm lata ad apicem; bacca violacea.

Terrestrial; **internodes** short, 7 mm diam.; **cataphylls** persisting as loose, organized fibers, to 4 cm long, drying dark red-brown and persisting as more or less erect fibers; **petioles** 9–11 cm long (averaging 10 cm), drying dark brown, 2 mm diam., sulcate adaxially with medial rib at apex and on geniculum; geniculum 5–7 mm long, drying reddish brown; **blade** moderately coriaceous, elliptic to ovate-elliptic, abruptly acuminate and apiculate to acuminate at apex, acute at base, 10–12 cm long, 4–5 cm wide (averaging 11 × 4.5 cm), 2.4 times longer than broad, 1.1 times longer than the petioles, broadest at or below middle, 1.0–1.2 times longer than petioles; upper surface drying dark brown, weakly glossy, epunctate; lower surface slightly paler drying semiglossy and paler yellow-brown, dark glandular-punctate but also densely covered with discrete, smaller, circular dots slightly darker than the dried surface; **midrib** narrowly raised, slightly darker and bluntly acute above, prominently raised below, drying slightly paler than surface and with a mostly distinct medial ridge; **primary lateral veins** 5–6 per side, arising at an acute angle then spreading at 50–60° angle, drying weakly raised above and much less prominent than the collective veins, narrowly raised below and nearly as prominent as collective veins below; **collective veins** arising from base, 4–6 mm from margin, drying deeply sunken above, narrowly raised and darker below; INFLORESCENCES erect-spreading; **peduncle** 35 cm long, much longer than leaves, drying dark reddish brown, and longitudinally folded, 1–2 mm diam.; **spathe** reflexed-spreading, subcoriaceous, maroon, lanceolate, 5 cm long, 4 mm wide;

spadix green, very weakly stipitate, narrowly long-tapered, erect, 16 cm long, 4 mm diam. near the base, 2 mm wide at apex. Flowers 3 visible per spiral, 4.2–4.4 mm long, 2.1–2.4 mm wide; tepals minutely granular on drying, lateral tepals 2.1–2.2 mm wide, the outer margin broadly 2-sided, the inner margin broadly rounded; stamens emerging just above the tepals and widely spaced; anthers .2 mm long, .4 mm wide, thecae moderately divaricate; stigma oblong, .4 mm long. INFRUCTESCENCES with **berries** turning violet.

Anthurium chucunesense is known only from the type locality at La Planada in Colombia (Nariño), at 1,800–1,900 m elevation in a *Premontane wet forest* life zone. In La Planada it is apparently rare, having been collected only once.

The species is a member of sect. *Porphyrochitonium* characterized by its terrestrial habit (though perhaps to be found epiphytically as well), short, slender internodes, moderately short, sulcate petioles, more or less elliptic, brown-drying, moderately coriaceous blades with a prominently raised upper midrib, sunken collective veins and especially by its very long peduncle which greatly exceeds the length of the leaves.

Anthurium chucunesense is seemingly closely related to *A. pazii* with which is shares a narrowly raised upper midrib, a long, slender, pointed spadix and a stiffly spreading spathe with the margins turned downward. That species differs however in having blades much thinner, proportionately longer and more narrowly acuminate as well as in having the primary lateral veins drying weak and undulated on both surfaces.

Anthurium chucunesense also seems related to *A. restropoae* which differs in having shorter petioles (5–7 cm long), broader blades which are inequilateral and rounded to weakly subcordate at the base, and have a second pair of basal veins as well as a pinkish sessile spadix. In addition the upper blade surface is densely and minutely papillate and with conspicuous warty raised areas (in contrast to moderately smooth on *A. chucunesense*).

Anthurium chucunesense also superficially resembles the Panamanian species *A. oxystachyum*, but that species differs in having blades drying greenish, and its venation on the lower surface is not as prominent as in *A. chucunesense*.

The epithet "chucunesense" is derived from the town of Chucunés located near the La Planada Reserve.

Anthurium esmeraldense Sodiro, *Anales Univ. Centr.* Ecuador 19(137): 337. 1905. Type: ECUADOR. Esmeraldas: between Río Lita and Cachabí, no date, *Sodiro s.n.* (B).

Anthurium discolor Sodiro, Anturios Ecuator 1: 80. 1905. Type: ECUADOR. Esmeraldas: between Río Santiago and Río Cachabi, *Sodiro s.n.* (QPLS).

Epiphytic or terrestrial; **internodes** short, broader than long, to 3 cm diam., drying reddish brown; **cataphylls** subcoriaceous, to 25 cm long, drying brown, persisting intact; **petioles** 36–81 cm long (averaging 63.4 cm), to 6 mm diam. in middle, medium green, semiglossy; **blades** subcoriaceous to moderately coriaceous, triangular-ovate, acuminate at apex, cordate to sagittate at base, (28) 42–59 cm long, 13.5–25 cm wide (averaging 46 × 19.5 cm), 2.1–2.5 times longer than broad, .5–.8 times longer than petiole; drying reddish brown; upper surface dark green and velvety; lower surface reddish green and moderately glossy, obscurely dark-punctate; **anterior lobe** 22–44 cm long, 3.5 times longer than the posterior lobes; **posterior lobes** 6–18 cm long, 5–14 cm wide, directed somewhat inward; **sinus** spathulate, 10 cm deep, 1.5–2.5 cm wide; **midrib** convex and much paler above, pale and triangular-winged below, drying slightly raised in valley above, acutely raised below; **basal veins** 5 pairs, first 2 pairs free to base, the remainder coalesced to 7 cm from base; **posterior rib** naked 1.5–3 cm; **primary lateral veins** 6–8 per side, departing midrib at 45°–60° angles, ascending to collective vein, raised below

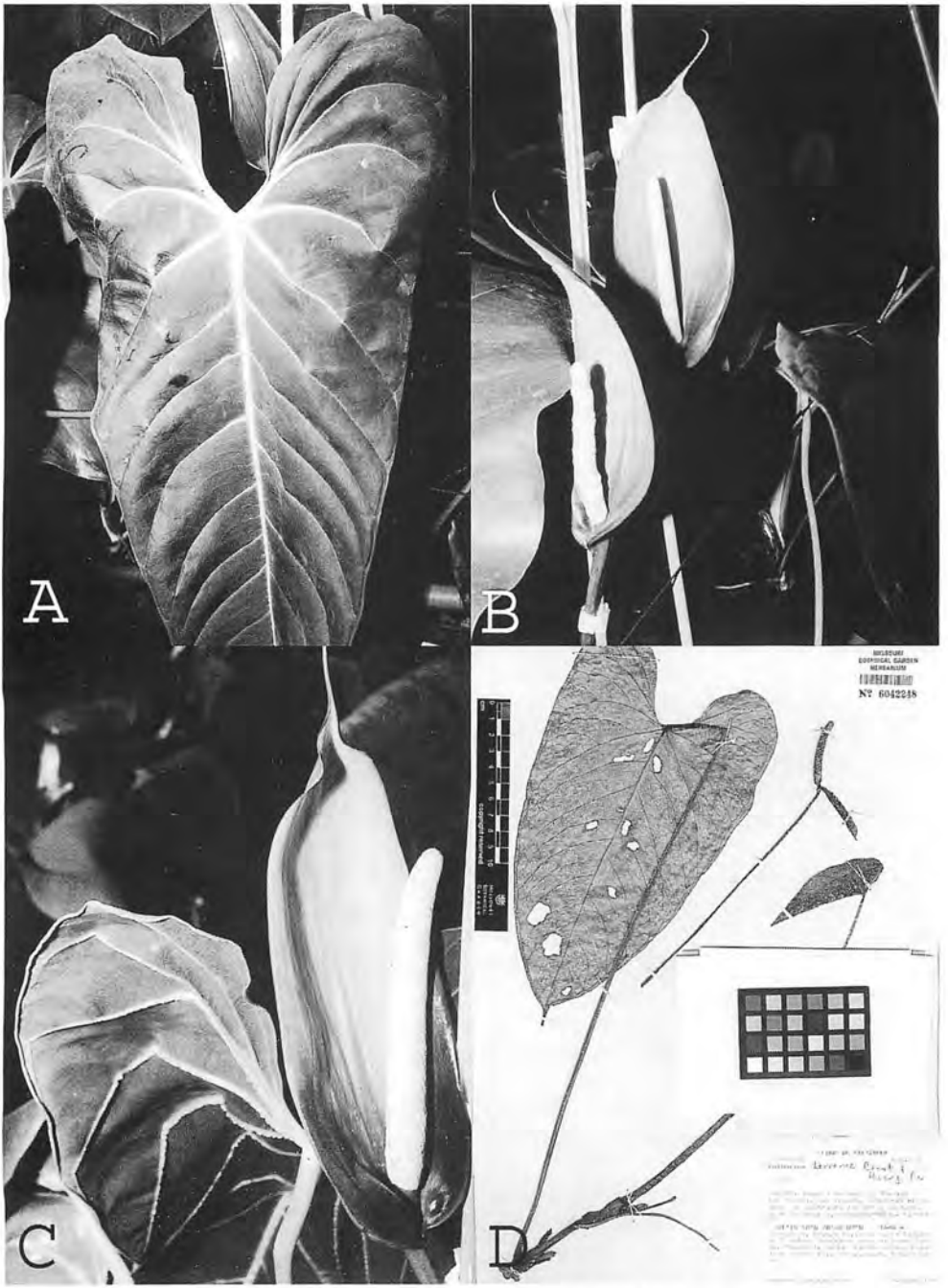

Fig. 7. a–c. *Anthurium esmeraldense* Sodiro. (*Croat 74033*, cultivated at Anthura, Inc., 90-10-77). a. Leaf blade, adaxial surface. b. Inflorescences. c. Inflorescence showing spathe and spadix. d. *Anthurium herrerae* Croat & P. Huang. (*Herrera 9649*). d. Herbarium specimen.

on drying; **collective vein** arising from one of the lowermost basal veins, varying from 2–9 mm from margin, indented to 9 mm at point of merging with basal veins, narrowing to 5–6 mm along lobes, narrowing further to 2 mm near apex; INFLORESCENCES erect to erect-spreading; **peduncle** 27–69 cm long, 4–15 mm diam. at middle; **spathe** 10–19 cm long, (3–) 4–6 cm wide, oblanceolate, often hooding spadix moderately glossy, medium green or red inside; **spadix** white, erect, cylindroid, 6.5–15 cm long, 1–1.5 cm diam. INFRUCTESCENCES not seen.

Anthurium esmeraldense occurs from Colombia (Nariño) to Ecuador (Cotopaxi, Esmeraldas, Pichincha) at 250–1,900 m in *Premontane moist forest*, *Premontane rain forest*, *Premontane wet forest* and *Tropical very dry forest*. Aside from the La Planada area the species is known to be very abundant in Esmeraldas Province of Ecuador along the Lita-San Lorenzo Road at ca. 600 m and it has also been collected in Cotopaxi Province at Tenefuerte along the Río Pilalo at 750–900 m, indicating that it is primarily a species of high elevation. It is to be expected in the intervening area in similar life zones. *Anthurium esmeraldense* is apparently quite rare at La Planada, as it has been collected only once, along the trail to El Hondon. The La Planada material differs from type material which has a narrower spathe which is red inside.

This species is a member of sect. *Calomystrium*. It is distinguished by its short internodes, persistent intact cataphylls, the triangular-ovate blades which are cordate to sagittate at the base and dark-punctate on the lower surface as well as by the green, hooding spadix and white spadix.

Sodiro recognized this species as *A. discolor*, due to the distinction in having a spadix which was reddish purple. It was probably based on a collection which was post anthesis since many members of sect. *Calomystrium* have spadices which turn color after anthesis.

Additional specimens examined: COLOMBIA. **Nariño:** Ricaurte, Sendero del "Rondon" cerca 2 km de centro de investigación, 01°09′55″N, 77°58′44″W, 1,900 m, 20 Jan 1997, *G. Herrera C. & Bittner 9142* (PSO); Trail to El Hondón, 6–12 km SW of 01°04′N, 78°02′W, 1,750–1,800 m, 5 Jan 1988, *Gentry et al. 60429* (MO, PSO).

Anthurium gerherrerae Croat **sp. nov.**

Type: COLOMBIA. Nariño: La Planada, 7 km above Chucunés, on road between Tuquerres and Ricaurte, Sendero Las Cruces, 2 km siguiendo al caril divisorio, 01°10′18″N, 78°00′09″W, 1,820 m, 2 Feb 1997, *G. Herrera 9337* (holotype, MO-5198155).

Internodia alternans brevia et longa; cataphylla 3–5 cm longa, petiolus 1.3–2.5 cm longus; lamina anguste oblongo-ovata, 11–19.5 cm longa, 3–6.3 cm lata; nervis primariis lateralibus 5–6 utroque; spatha oblongo-lanceolata, 2.2–3.2 cm longa, 5–6 mm lata, bruneolus ruber; stipes 2–3 mm longus; spadix 4.5–5 cm longus, 2–3 mm diam. in siccus, viridis vel virellus ruber.

Hemiepiphytic vine, in part pendent from trees; **internodes** mostly alternating long and short, the shorter ones only ca. 5 mm apart, each with spreading cataphyll fibers, the longer ones 2.5–9 cm long, 2.5–4 mm diam., drying greenish, closely and prominently ridged on drying, in part densely reddish brown granular-puberulent, the trichomes sometimes appearing branched; **cataphylls** 3–5 cm long, drying reddish brown, erect-spreading, sometimes curved; **petioles** 1.3–2.5 cm long (averaging 1.9 cm), sheathed to about the middle, subterete; geniculum 6–10 mm long; **blades** narrowly oblong-ovate, gradually to abruptly acuminate at apex, rounded at base, 11–19.5 cm long, 3–6.3 cm wide (averaging 12.7 × 3.8 cm), 3.0–3.6 times longer than wide, 5.9–6.3 times longer than the petioles, drying grayish green above, yellow-green below; both surfaces moderately densely glandular-punctate; margins revolute; midrib narrowly rounded-raised and concolorous above, similar but not as thick below, drying somewhat acute above; **primary lateral veins** 5–6 pairs, drying raised on both surfaces; interprimary veins

almost as prominent but lacking loop-connections at collective vein; **collective veins** arising from the base, weakly loop-connecting at primary lateral veins, 4–10 mm from the margins. Inflorescence spreading; INFLORESCENCES with **peduncle** 10 cm long, less than 2 mm diam., drying 1 mm wide; **spathe** oblong-lanceolate, to 2.2–3.2 cm long, 5–6 mm wide, brownish red, spreading at ca. 90° to the peduncle; **spadix** 4.5–5 cm long, drying 2–3 mm diam., stipitate 2–3 mm, slightly tapered to apex, green to greenish red, turned upward at 115° angles. Flowers 4 visible per spiral, 1.9–2.1 mm long; lateral tepals .9–1.1 mm wide, the outer margins 2-sided, the inner margins rounded, drying dark brown, matte; stamens not seen.

Anthurium gerherrerae is endemic to Colombia (Nariño), known only from the La Planada Reserve at elevation of 1,850 m. It occurs only in *Premontane wet forest.*

Anthurium gerherrerae belongs to sect. *Tetraspermium*. This species is easily distinguished at La Planada by its frequently pendent, viney habit, long, frequently rufescent-puberulent internodes, oblong-ovate, glandular-punctate blades.

Anthurium geherrerae resembles another species *A. laciniosum* from Ecuador (Pichincha). *Anthurium laciniosum* also has basket-shaped fibrous cataphylls and glandular-punctate blade surfaces. However, it differs in not having the conspicuous alternate long/short internodes.

The species is also similar to *A. citrifolium* but that species differs in having the cataphylls more tightly appressed to the stem and in having ovate to ovate-elliptic blades rather than narrowly oblong-ovate blades.

The species is named in honor of Costa Rica botanist, Gerardo Herrera, who, along with Jens Bittner was the first collector of the species.

Paratype: COLOMBIA. **Nariño:** Ricaurte, La Planada Sendero Las Cruces, 2 km oeste, siguiendo el carril divisoria, 01°10′18″N, 78°00′09″W, 1,850 m, *G. Herrera & Bittner 9365* (MO, PSO).

Anthurium gracilistipum Croat **sp. nov.** Type: COLOMBIA. Nariño: La Planada, 7 km above Chucunés, on road between Tuquerres and Ricaurte, along summit of hill behind Centro Cientifico, 01°05′N, 78°01′W, 1,780 m, 28 July 1988, *T.B. Croat 69637* (holotype, MO-4369447; isotypes, B, COL, K, PSO, US).

Internodia 6–12 cm longa; cataphylla decidua, 4–6 longa; petiolus 1–4 cm longus, anguste et leviter sulcatus; lamina ovata vel ovato-elliptica, (5–) 9–13 cm longa, (1.7–) 3–6.5 cm lata, atro-virens et nitida; nervis primariis lateralibus 8–9 utroque; pedunculus 2–4 cm longus; spatha 1.5–3 cm longa, viridis suffusus purpurascens; spadix 1.5–2 cm longus, purpurascens subanthesi, stipitata (1–5 cm longus, suffusus purpuracens); baccae viridi-flavae.

Epiphytic; **internodes** 6–12 cm long, 3.5 mm diam. (drying 2 mm diam.); **cataphylls** subcoriaceous, clasping stems, 4–6 cm long, apiculate to acuminate at apex, pale green, drying medium orangish brown, persisting intact at upper nodes, deciduous or persisting as a few unorganized pale fibers lower on stem; **petioles** 1–4 cm long (averaging 2.3 cm), drying 1–1.5 mm diam., terete, narrowly and weakly sulcate; **blades** narrowly ovate or ovate-elliptic, narrowly long-acuminate at apex, obtuse to rounded at base, (5–) 9–13 cm long, (1.7–) 3–6.5 cm wide (averaging 11.2 × 4.5 cm), 2.5–3 times longer than wide, 4–7 times longer than the petioles, broadest below middle, thinly coriaceous, dark green and weakly glossy above, slightly paler and semiglossy below, drying dark brown above, yellow-brown below, epunctate on both surfaces; **midrib** narrowly raised and slightly paler above, convex and paler below; **primary lateral veins** 8–9 per side, moderately obscure and weakly quilted above, obscure and slightly darker below; other veins obscure; **collective veins** two pairs, the inner originating from primary lateral veins near base, 2–6 mm from margin, the outer pair originating from the base and running very close to the margin and usually entirely merging with the margin before the middle

Fig. 8. a–d. *Anthurium gracilistipum* Croat. (*Croat 69637*). a. Habit. b. Stem showing petioles and both surfaces of leaf blades. c. Inflorescence showing spadix. d. Infructescence.

of the blade. INFLORESCENCES erect; **peduncle** 2–4 cm long, 1 mm diam.; **spathe** erect, ovate, green tinged purplish, 1.5–3 cm long; **spadix** purplish at anthesis, cylindroid, 1.5–2 cm long, 1.5–2.5 mm diam, stipitate, stipe 1–5 cm long, 1 mm diam., tinged purplish. Flowers 2–3 per primary spiral, 1.1–1.3 mm long, 1.0–1.2 mm wide;. INFRUCTESCENCES with **fruiting spadix** brownish-red, 3.5–4.5 cm long, 6–9 mm diam.; **berries** greenish yellow and exserted before becoming mature.

Anthurium gracilistipum ranges from Colombia (Nariño) to Ecuador (Carchi) at elevations of 1,500–2,275 m in *Premontane wet forest* and *Lower montane wet forest* life zones.

This species is a member of sect. *Xialophyllium*, and is characterized by its epiphytic habit, elongate, slender internodes, cataphylls deciduous or persisting as a few unorganized pale fibers, the narrowly ovate or ovate-elliptic brownish-drying blades, the green, ovate spathe and the slender stipitate (hence the epithet "gracilistipum") purplish spadix with greenish yellow berries.

Anthurium gracilistipum is most similar to *A. pulchellum*, another species that has a long stipitate spadix but that species differs in having narrowly oblong-elliptic blades which are 3.1–4.7 times longer than wide rather than ovate to ovate-elliptic blades which are 2.7–3 times longer than wide and also has the slender cataphylls persisting intact instead of being deciduous or persisting as a few unorganized pale fibers lower on stem.

At La Planada the species can be most easily confused with *A. terracolum*, a species which also has long-stipitate spadices. That species differs in usually being terrestrial, in having internodes typically broader and proportionately shorter, many more persistent cataphyll fibers, blades that are more nearly elliptic, merely short-acuminate and have much more prominent collective veins.

Paratypes: COLOMBIA. **Nariño:** Ricaurte, La Planada, 1,800 m, 25 Jul, 1986, *Gentry et al. 55189* (PSO); 26 Feb 1992, *Croat 72414* (MO); 25 Apr 1976, *Benavides 360* (PSO); 20 Jul 1992, *Restrepo 583* (MO, PSO); Borde Pialapí, 1,800 m, 18 Nov 1993, *791* (MO, PSO); Quebradas, El Mar-La Calladita, 01°10′N, 77°58′W, 1,500–1,800 m, 30 Apr 1988, *Benavides 9691* (MO, PSO); 25 Sep 1989, *10752* (PSO); 18 Jan 1990, *11344* (PSO); 01°08′N, 77°58′W, 1,750 m, 29 Nov 1981, *Gentry 35194* (COL, MO). ECUADOR. **Carchi.** Embankments along Río Verde, 00°52′N, 78°8′W, 1,890 m, 29 Nov 1987, *W. S. Hoover 1961* (MO); Trail beginning above Rafael Quindí Finca, above Untaland partly ascending Cerro Obscura, 00°52′N, 78°9′W, 1,670 m, 26 Nov 1987, *W. S. Hoover & S. Wormley 1692* (MO); ca. 6 km above Maldonado, just below Puente de Palo, 00°54′N, 78°06′W, 2,275 m, 23 May 1993, *B. Boyle & J. Bradford 1898* (MO); Embankments along Río Verde,00°52′N, 78°8′W, 1,890 m, 29 Nov 1987, *W. S. Hoover 1962* (MO).

Anthurium herrerae Croat & P. Huang **sp. nov.** Type: COLOMBIA. Nariño: Municipio Ricaurte, Altaquer-Tumaco, vic. Altaquer, Río Ñambí, 6 km W of Altaquer; 01°18′N, 78°04, 1,100–1,130 m, 20 Mar 1990, *T. B. Croat 71633* (holotype, MO-3824008; isotype, PSO).

Internodia 1–5 cm longa, .7 mm diam.; cataphylla persistens intacta; petiolus 20–48 cm longus; lamina ovato-cordata, 21–28.2 cm longa, 12–14 cm lata; lobulas posterioribus 6.0–7.2 cm longus; nervis basalibus 4–5 utroque; nervis primariis lateralibus 5 utroque; spatha viridis, 3 cm longa, 3 mm lata; spadix 4.3 cm longus, 5 mm diam.

Terrestrial; all parts infected with fungal pustules; stems elongate; **internodes** long, ca. 5 cm long, ca. .7 cm diam., drying brown, velvety or at least matte, drying closely and finely ridged; **cataphylls** 2.5–10.5 cm long, red-brown to brown, persisting intact, drying with a densely granular surface; **petioles** 28–40 cm long, 5 mm diam., somewhat sulcate, drying red-brown, matte to semiglossy; **blades** ovate-cordate, 21–28.2 cm long, 14 cm wide, 1.5 times longer than wide, .5 times as long as

petioles, broadest in the lower 1/3 of the blade, subcoriaceous; both surfaces medium yellow-brown, glossy to semiglossy, upper surface epunctate, drying semiglossy and moderately granular; lower surface drying slightly paler, medium yellow-brown, darkly dark-punctate, with paler granulations in the areoles, major veins on lower surface yellowish when fresh; **anterior lobe** 20.2 cm long, broadly convex; **posterior lobe** 6.8–7.2 cm long, 5.2–5.5 cm wide; **midrib** conspicuously raised on both surfaces, convex and concolorous above, drying narrowly raised and darker, reddish brown below; **basal veins** 4–5 pairs, first 2 pairs free to base, raised on both surfaces, 3rd and higher pairs fused 1.5–2 cm long, these raised on lower surface, but sunken on upper surface; **posterior rib** 1–1.5 cm long, curved; **primary lateral veins** 5 pairs, departing midrib at 35°–45° angles, somewhat raised on upper surface near midrib, sunken toward margins, narrowly raised on lower surface, **tertiary veins** raised somewhat on both surfaces. INFLORESCENCES erect; peduncle 16.3 cm long, drying 1 mm diam., dark yellow-brown; **spathe** green, oblong-linear, abruptly cuspidate, 4–4.3 mm long, 6–10 mm wide, drying drying dark brown; **spadix** sessile, whitish, cylindroid, 4.3 cm long, 5 mm diam. Flowers 5–6 visible per spiral, 1.9–2.1 mm long; tepals 1.2 mm wide, minutely granular, the outer margins 2–3-sided, inner margins rounded. INFRUCTESCENCES not seen.

Anthurium herrerae is known only from Colombia in Nariño Dept. at the La Planada Reserve and at the Reserva Río Ñambí at elevation of 1,100–1,600 m, in *Premontane wet forest.*

This species belongs to sect. *Calomystrium* and is recognized by its elongate internodes, persisting intact cataphylls, moderately terete, elongate petioles, ovate-cordate blades with short posterior lobes as well as by the long-pedunculate inflorescence with a green spathe and short, cylindroid spadix. In addition all parts infected with yellow fungal pustules, a feature that appears to be species-specific for some members of sect. *Calomystrium.*

Anthurium herrerae is similar to *A. fragriflorum* from the Bajo Calima region of Valle Dept. but that species differs in having cataphylls 11–30 cm long, blades 34–61 cm long and 12–34 cm wide, 1.6–2.2 (–2.9) times longer than wide, an inflorescence with the **peduncle** 21–42 cm long, the spathe 8–15.3 cm long, 1.5–4 cm wide, the spadix stipitate 1–2 cm and 8–15 cm long.

The species is named in honor of Costa Rica botanist Gerardo Herrera who, along with Jens Bittner was the first collector of the species at La Planada.

Paratypes: COLOMBIA. *Nariño*, La Planada, San Isidro,. Las Cruces, Cabeceras Hondonadas de Quebrada gue dan a Corcuel, 01°10′18″N, 78°00′09″, 1,600 m, 4 Jun, 1997, *G. Herrera & J. Bittner 9649* (MO, PSO).

Anthurium keatingii Croat **sp. nov.** Type: COLOMBIA. Nariño: La Planada Reserve, 7 km from Chucunés, cloud-cloud forest, 01°05′N, 78°01′W, 7 Jan 1988, *A. Gentry, O. de Benavides & P. Keating 60555* (holotype, MO-3641803; isotype, PSO).

Internodia brevia, 1.0–2.5 cm diam.; cataphylla ca. 5 cm longa, persistens in fibris; petiolus ca. 28 cm longus, 3–4 mm diam.; lamina elliptica, 23 cm longa, 11 cm lata, nervis basales 2–3 utroque, liber ad basim; nervis lateralibus primariis ca. 19 utroque; spatha lanceolata, 10 cm longa, 1.5 cm lata, marroninis, spadix viridis, stipitatus 3 mm, 13 cm longus, 5 mm diam. prope basim, 3.5 mm diam. ad apicem.

Epiphytic; **internodes** short, 1.0–2.5 cm diam.; **cataphylls** fibrous; ca. 5 cm long, drying dark red-brown, persisting as fibers and fragments of epidermis. LEAVES erect-spreading; **petiole** ca. 28 cm long, 3–4 mm diam., subterete, obtusely sulcate adaxially, weakly glossy, drying dark brown; **blade** elliptic, acuminate at apex, acute at base, 23 cm long, 11 cm wide, 2.1 times longer than wide, .8 times longer than the petiole, widest at or slightly below middle, drying dark brown, inequilateral, one side 5.7 mm wider, subcoria-

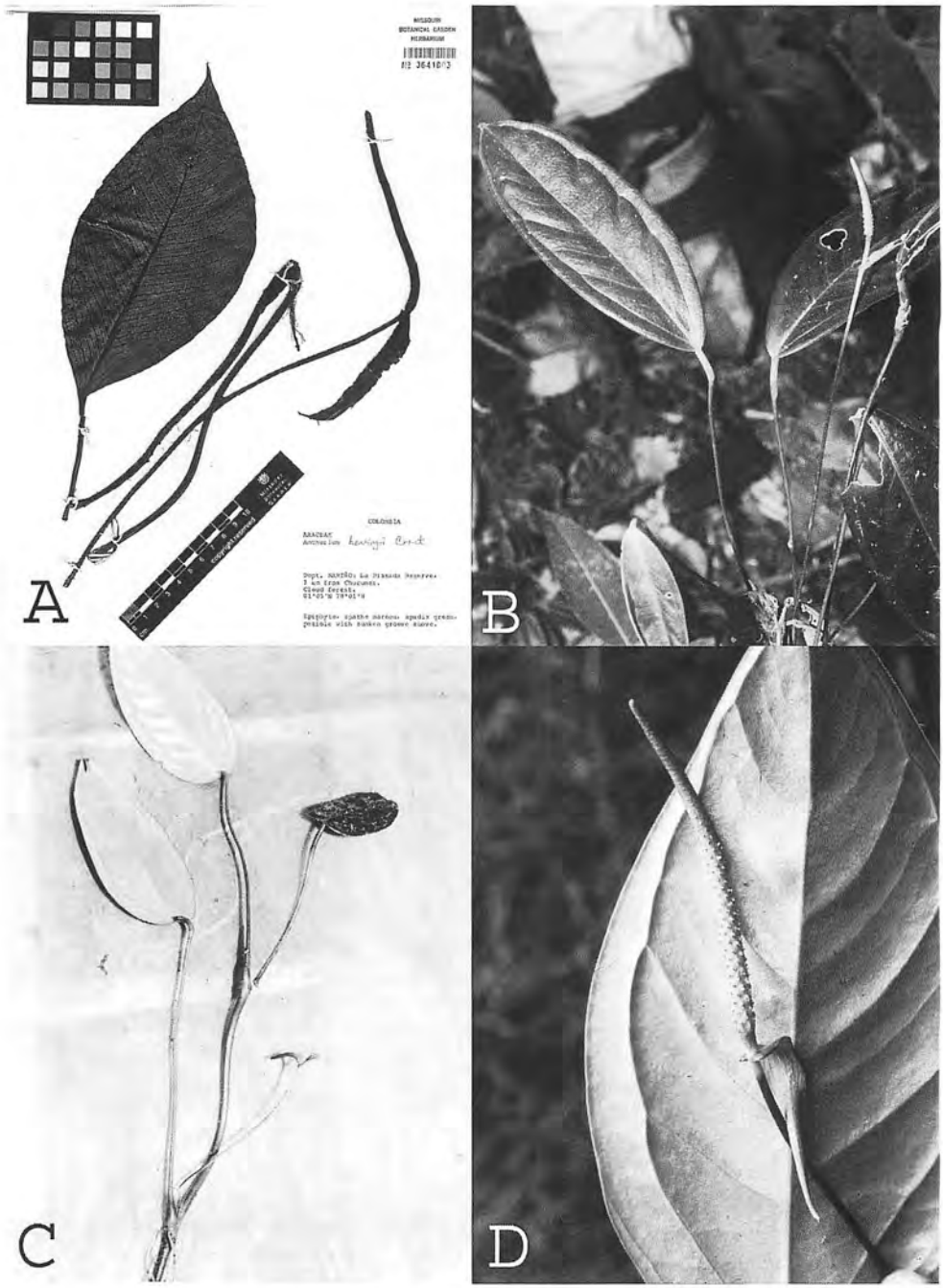

Fig. 9. a. *Anthurium keatingii* Croat. (*Gentry 60555*). a. Herbarium specimen. b–d. *Anthurium longegeniculatum* Engl. (*Croat 69634*). b. Habit. c. Fresh, unmounted specimen showing stem and leaves d. Leaf blade, abaxial surface; inflorescence showing spathe and spadix.

ceous; **midrib** drying rounded-raised and darker below, finely striate below; **basal veins** 2–3 pairs, free to base; **primary lateral veins** ca. 19 pairs, departing midrib at 45–60 degree angle, ascending to collective vein, drying considerably darker than surface below; **interprimary veins** nearly as prominent as primary lateral veins, numerous; **collective veins** 2 or 3 pair per side, arising from the base, the innermost ascending to the apex, 4–5 mm from the margin, the 2nd pair of basal veins ending in the lower 1/3 of blade, on one a marginal veins merging with the margin in lower 3 cm of the blade; upper surface dark green and matte, minutely glandular-punctate, the surface drying minutely papillate. INFLORESCENCES with **peduncle** 28 cm long, 2 mm diam.; **spathe** lanceolate, 10 cm long, 1.5 cm wide, reflexed, acuminate at apex, merging onto petiole at a broad angle, subcoriaceous, maroon, drying dark brown, matte, conspicuously undulate along the margins, long-apiculate at apex (apiculum 8 mm long), **spadix** green, stipitate 3 mm, weakly tapered, 13 cm long, 5 mm diam. at base, 3.5 mm diam. at apex. Flowers 5–7 visible per spiral, 1.8–2.6 mm long; tepals minutely granular, lateral tepals 1 mm wide, the outer margins 2-sided, the inner margin broadly rounded; stamens retracted beneath the surface of the tepals; style oblong, 1.5–2 mm long.

Anthurium keatingii is known only from the type collection at La Planada Reserve in Colombia (Nariño), at 1,800 m in *Premontane wet forest* life zone. It is apparently uncommon at La Planada, having been collected only once.

The species, a member of sect. *Porphyrochitonium*, is recognized by its epiphytic habit, long, sulcate petioles, elliptic blades which are glandular-punctate on both surfaces and by its long-pedunculate inflorescence with a green spadix and a maroon spathe but especially by the numerous primary lateral veins with 2 or more pairs of collective veins.

It does not closely resemble any other known species of sect. *Porphyrochitonium*. The species resembles another undetermined *Porphyrochitonium* (*Tipaz et al. 1980*) from Ecuador in Carchi Province, Parroquia Tobar Donoso, Reserva Indígena Awá, Centro El Baboso, 00°53′N, 78°25′W, at 1,800 m. That species dries the same color and has a similarly long-pedunculate inflorescence as well as similar cataphylls but the *Tipaz et al. 1980* collection differs in having, sharply 3-sided petioles, narrower blades 3 times longer than wide, having the collective veins closer to the margin 1–2 mm, the upper surface eglandular and a longer, proportionately more slender purplish spadix.

Anthurium lakei Croat & P. Huang **sp. nov.** Type: COLOMBIA. Nariño: La Planada Reserve, 7 km above Chucunés on road between Tuquerres and Ricaurte, flat swampy plain S of Sendero Natural, 01°05′N, 78°01′W, 1,780 m, *T. B. Croat 69632* (holotype, MO-4369440; isotypes, AAU, B, COL, CUVC, F, HUA, K, M, NY, PMA, PSO, QCNE, S, SEL, UB, US, USM, VEN).

Internodia brevia, 1.0–2.5 cm diam.; cataphylla 3–4.5 cm longa; petiolus 12–40 cm longus, 3–5 mm diam., teres vel C-formatus; lamina anguste elliptica, (16–) 20–27 (–36) cm longa, (4.5–) 5.8–7.5 cm lata; nervis primariis lateralibus (9–) 10–12 (–13) utroque; spatha 4–7 cm longa, 6–15 mm lata; spadix flavo-viride vel viridis, 7–15 cm longus, 5–8 mm diam. prope basim, 2–4 mm ad apicem.

Epiphytic; **internodes** short, 1.0–2.5 cm diam.; **cataphylls** 3–4.5 cm long, persisting semi-intact or as fibers, only at the uppermost nodes, the remainder sometimes deteriorating into a sodden, reddish brown mass, drying reddish brown; **petioles** 12–40 cm long (averaging 28.7 cm), 3–5 mm diam., erect, terete to sharply C-shaped, sulcate or with 3 narrow ribs adaxially; geniculum moderately swollen, 1–2 cm long, drying dark brown; **blades** narrowly elliptic, acuminate at apex, acute to obtuse at base, (16–) 20–27 (–36) cm long, (4.5–) 5.8–7.5 cm wide (averaging 26 × 6.4 cm), 2.5–4 times longer than wide, .5–1.25 times longer than the petioles, broadest at or slightly below the middle,

moderately bicolorous, subcoriaceous; moderately glossy on both surfaces, drying dark brown to gray-brown above, slightly paler and yellowish brown below; upper surface drying moderately smooth but minutely granular on magnification; lower surface moderately smooth, densely dark brown glandular-punctate, the punctations .05 mm diam; **midrib** convex and paler above, narrowly rounded to bluntly acute and somewhat paler below, drying concolorous, much thicker than broad, sometimes moderately acute above, thicker than broad, striate, slightly darker to slightly paler below; **primary lateral veins** (9–) 10–12 (–13) per side, weakly quilted-sunken or etched-sunken above, weakly pleated-raised below; **interprimary veins** etched above, weakly raised below, often scarcely less conspicuous than primary lateral veins; **tertiary veins** mostly obscure; **collective vein** arising from the base, 2–4 mm from margin; INFLORESCENCES spreading to erect-spreading, at height of or beneath blades; **peduncle** 20–50 cm long, 1–3 mm diam., terete to 1-angular; **spathe** erect-spreading to spreading, pink or green tinged purple inside and along margins outside, lanceolate, 4–7 cm long, 6–15 mm wide; **spadix** yellow-green or green and moderately glossy when young, turning dark purple by anthesis, sessile or very weakly stipitate, slightly tapered, 7–15 cm long, 5–8 mm diam. at base, 2–4 mm diam. at apex. Flowers 1.3–1.7 cm long, 1.3–1.5 cm wide; lateral tepals drying dark brown, minutely granular, .9–1.1 mm wide, 2-sided on outer margin, broadly rounded on inner margin but turned up against the pistils and often appearing straight or concave on dried specimens; stamens held in a tight cluster at opposite sides of the pistil immediately above the tepals; anther .3 mm long, .4 mm wide; pollen pale orange. INFRUCTESCENCES with **berries** white at apex, violet-purple in lower half; tepals dark green in fruit.

Anthurium lakei is endemic to Colombia (Nariño), known only from the type locality in La Planada, at elevations of 1,500–2,010 m, in *Premontane wet forest* life zone.

A member of sect. *Porphyrochitonium*, this species is apparently somewhat rare at La Planada; it was seen in the swampy area south of Sendero Natural, along the trail behind the Centro Cientifico and along the trail to Pialapí. It is recognized by its moderately short internodes, terete to sharply C-shaped petioles with 3 adaxial ribs, more or less elliptic, semiglossy blades with etched primary lateral veins, green spadix which turns purple by anthesis, and by its purple and white berries.

Anthurium lakei is most easily confused with *Anthurium margaricarpum* from Volcán Pichincha in Pichincha Province of Ecuador. That species differs in having the blades dry more typically grayish on the upper surface, lacking the granular lower surfaces and areolate on the upper surface rather than smooth. *A. lakei* is also quite similar to the *A. fuscopunctatum* Sodiro. It differs, however, in having longer cataphylls (6–8 cm long), petioles that are merely sulcate (lacking 3 ribs adaxially), broader blades (8–10 cm wide), flowers much longer than wide.

This species was named after Jeffrey Lake, one of the co-authors of this paper. Jeff spent the summer of 1990 working on this publication. At that time, Jeff was a student of Grinnell College in Grinnell, Iowa and was working as an intern with Washington University, Missouri. His skills at putting together the initial manuscript, preparing descriptions and making important taxonomic decisions were essential for the completion of this Flora.

Paratypes: COLOMBIA. **Nariño:** Ricaurte, Reserva La Planada. Quebradas, El Mar - La Calladita, 01°10′N, 77°58′W, 1,500–1,800 m, 30 Apr 1988, *Benavides 9654* (MO); Along Sendero Vieja, along ridge top in direction of La Pina, 01°06′N, 77°54′W, 1,950–2,010 m, 9 Mar 1990, *Croat 71219* (MO, PSO); 01°05′N, 78°01′W, 7 Jan 1988, *Gentry, et al. 60561* (MO).

Anthurium lancea Sodiro var. ***ecostatum*** Croat, **var. nov.** Type: COLOMBIA. Nariño: La Planada, 7 km above

Fig. 10. a–d. *Anthurium lakei* Croat & P. Huang. a–b, d. (*Croat 69632*). a. Habit. b. Leaf blade, adaxial surface. c. Inflorescence showing spadix. (*Croat 71219*). d. Infructescence.

Fig. 11. a. *Anthurium lakei* Croat & P. Huang. (*Croat 69632*). Habit. b–d. *Anthurium longicaudatum* Engl. (*Croat 69572*). b. Leaf blade, adaxial surface. c. Inflorescence showing spathe and spadix. d. Infructescence.

Chucunés on road between Tuquerres and Ricaurte, primary and secondary regrowth forest above La Posada, *Croat 69574* (holotype, MO; isotypes, B, COL, GB, HUA, K, NY, PSO, QCNE, US, VEN).

Internodia 4–6 cm longa, 1.5–3 cm diam.; cataphylla, persistens in fibris, 12–16 cm longa; petiolus 35–50 (–65) cm longus, 5–9 mm diam., teres aut obscure et anguste sulcatusus; lamina 25–39 cm longa, 12–26 cm lata, ovata, interdum lentiter cordata, in sicco atra; nervis basalibus liberis ad basin, nervis primariis lateralibus 8–9 utroque; spatha viridis, 6–11 mm longa, 1–2 cm lata; spadix flavus - viridis, 3–15 mm longa, 3–7 mm diam.; baccae purpurea.

Terrestrial; **internodes** 4–6 cm long, 1.5–3 cm diam.; **cataphylls** deciduous or not, drying red-brown, 12–16 cm long, decaying to tan fibers or persisting intact at upper nodes; **petioles** 35–50(65) cm long (averaging 47.7 cm long), 5–9 mm diam., terete or obscurely and narrowly sulcate, medium green, semiglossy; geniculum sulcate, 2 cm long; **blades** narrowly ovate to ovate, acuminate at apex, obtuse to truncate at base, occasionally very weakly cordate, 25–39 cm long, 12–26 cm wide (averaging 31 × 17 cm), 1.5–2.2 times longer than wide, .5–.8 times longer than the petioles, drying black, subcoriaceous; upper surface dark green, semiglossy; lower surface much paler and matte to weakly glossy, drying somewhat blackened; **midrib** narrow, convex, and scarcely paler above, slightly paler and prominently round-raised below; **basal veins** 3–4, more or less free to base; **primary lateral veins** 8–9 per side, departing midrib at 35°–45° angles, ascending to the collective vein, quilted-sunken above, bluntly acute and pleated-raised below; **collective vein** originating near base, usually from second basal vein, 4–9 mm from margin; **tertiary veins** weakly sunken in part above, raised below; INFLORESCENCES erect to erect-spreading; **peduncle** 44–55 cm long, 3–7 mm wide at base, 2–3 mm wide at apex; **spathe** lanceolate to slightly elliptic, 6–11 mm long, 1–2 cm wide, reflexed-spreading, green; **spadix** pale to medium yellow-green, short-stipitate, with stipe 3–15 mm long, cylindroid to slightly tapered, 3–7 mm diam. Flowers 3–4 on principal spiral, 2.4–2.8 mm long, 2.3–2.7 mm wide. INFRUCTESCENCES to 15 cm long; **berries** early emergent, bluntly acute and dark purple.

Anthurium lancea Sodiro var. *ecostatum* is mostly distributed in Colombia (Nariño), at elevations of ca. 1,800 m in *Premontane wet forest*, but one specimen was also found in Colombia (Chocó) at an elevation of 440 m in *Tropical rain forest*. It is fairly common at La Planada, collected in secondary and elements of primary forest above the La Posada (*Croat 69574*), as well as other less specific sites (*Gentry*, *Benavides* collections).

This taxon, of uncertain sectional classification though currently placed in sect. *Belolonchium* for lack of a better classification, does not fit the classic characteristics of that section. It is recognized by its more or less ovate-triangular, black-drying blade with basal veins free to base hence lacking a posterior rib and thus the epithet "ecostatum" (ie. lacking a costa or posterior rib). Also characteristic is the weakly stipitate spadix in contrast to the typical variety which usually has a conspicuously stipitate spadix.

The variety *ecostatum* differs from the typical variety of *A. lancea* in having no posterior rib and in having narrower, noncordate blades as well as in having a spadix with virtually no stipe.

Paratypes: COLOMBIA. **Nariño:** Ricaurte, La Planada, 01°09′37″N, 77°59′13″W, *G. Herrera 9534* (PSO); Salazar Finca 7 km above Ricaurte, 01°08′N, 77°58′W, 1,750 m, 29 Nov 1981, *Gentry 35196* (COL, MO); 01°10′N, 77°58′W, 1,800 m, 15 Nov 1987, *Benavides 8952* (MO, PSO); Borde Hermógenes, 01°10′00″N, 77°55′00″W, 1,800 m, 18 Nov 1993, *Restrepo 784* (MO); 01°10′00″N, 77°55′00″W, 1,800 m, 29 Sep 1992, *Restrepo & G. Ramírez 612* (MO).

Anthurium longegeniculatum Engl., *Bot. Jahrb. Syst.* 25:379. 1898. Type:

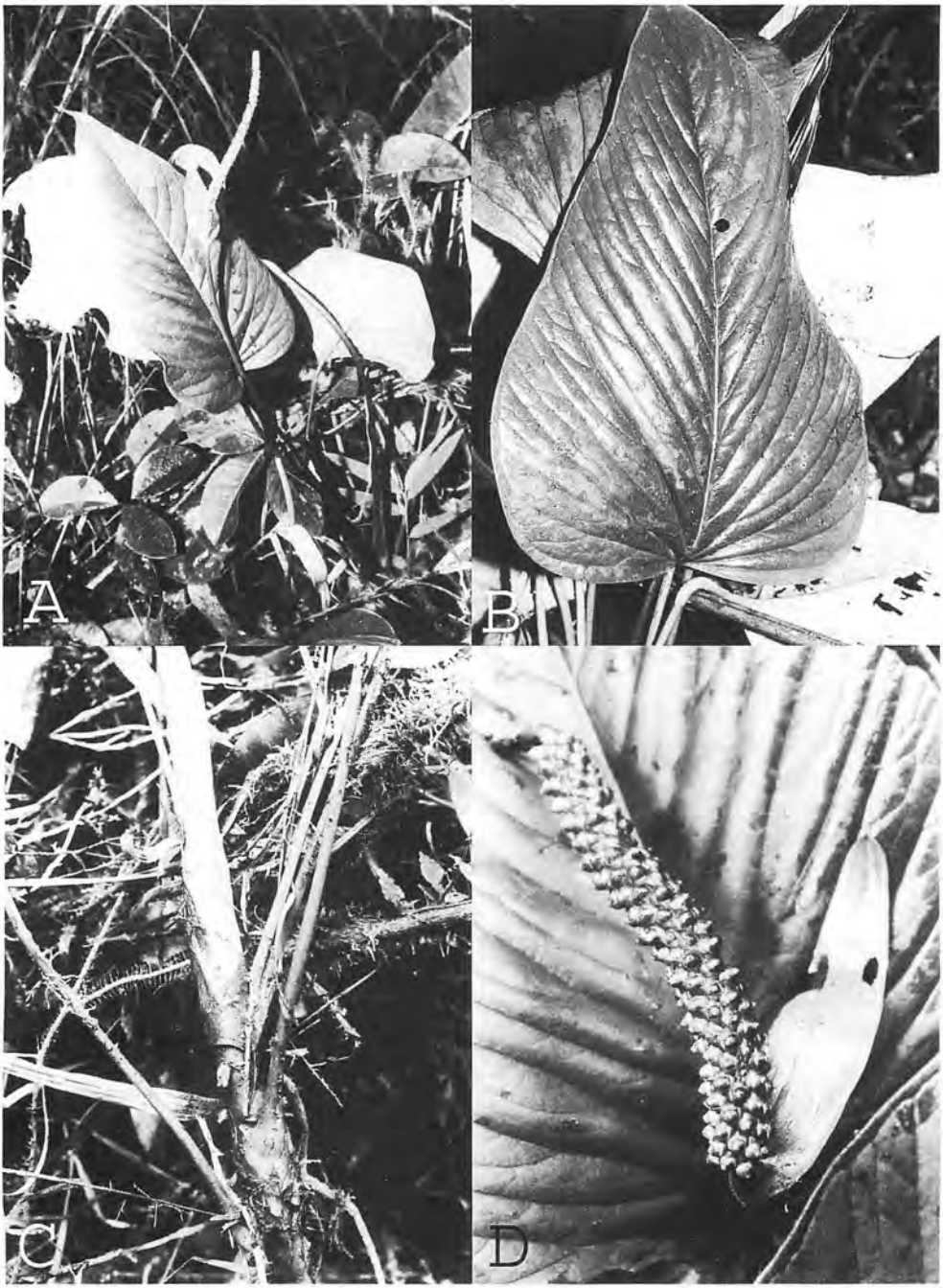

Fig. 12. a–d. *Anthurium lancea* var. *ecostata* Croat. (*Croat 69574*). a. Habit. b. Leaf blade adaxial surface. c. Stem showing cataphylls and base of petioles. d. Inflorescence showing spathe and spadix.

COLOMBIA. Cauca: Le Ceja, eastern slopes of Andes of Popoyan, *Lehmann 5328* (holotype, K; isotype, F).

Epiphytic or terrestrial; **internodes** smooth, semiglossy, 6–19 cm long, 3.5–5 mm diam., reddish brown; **aerial roots** originating from nodes, 1–4 per node, not very conspicuous, drying gray-black, 5–8 cm long, weakly branched or not at all branched; **cataphylls** subcoriaceous, 2.5–3.5 cm long, red-brown, drying reddish brown, persisting semi-intact at upper nodes, as fibers at lower nodes; **petioles** 10–20 cm long (averaging 15.7 cm), 2–3 mm diam., terete, tinged reddish, semiglossy; geniculum 2–2.5 cm long, drying black; **blades** ovate to ovate-elliptic, narrowly long-acuminate to almost aristate at apex, rounded at base, 9–15 (–21.5) cm long, 4–7 (–12.8) cm wide (averaging 13.3 × 6 cm), 2.0–2.5 times longer than broad, .7–1.1 times as long as the petioles, broadest below middle, subcoriaceous to moderately coriaceous; semiglossy to glossy, conspicuously bicolorous, dark green and semiglossy above, moderately paler and semiglossy below, drying medium greenish brown to yellowish brown above and smooth to usually minutely granular above, grayish yellow-green and faintly dotted below with pale round moderately obscure punctations below; **midrib** slightly paler, acutely raised, often in valleys above, acute and paler below; **primary lateral veins** 5–6 per side, departing midrib at 45°–60° angles, ascending to collective vein, etched and weakly quilted above, weakly pleated-raised below, as conspicuous as the collective vein; **tertiary veins** obscure; **collective veins** arising from near base, 4–7 mm from margin. INFLORESCENCES erect; **peduncle** to ca. 12 cm long, 1–1.5 mm diam.; **spathe** erect-spreading, reflexed, tinged purple; **spadix** yellowish green, moderately glossy, cylindroid to slightly tapered, ca. 2.5 cm long, 3 mm diam. at base, 2 mm diam. at apex; lower pistils weakly emergent.

Anthurium longegeniculatum is known from Colombia (Antioquia, Cauca, Cundinamarca, Huila, Nariño, Putumayo, Risaralda, Tolima, Valle del Cauca), Ecuador (Azuay, Cañar, Carchi, Loja, Morona-Santiago, Napo, Sucumbios, Tungurahua) to Peru (Cajamarca) and Venezuela (Trujillo), at elevations of 1,750–4,000 m, primarily at altitudes over 2,000 m, in *Premontane wet forest*, *Premontane rain forest*, *Lower mountain rain* forest, *Lower mountain wet forest* and *Montane wet forest* life zones. This species is apparently rare at La Planada, having been collected only twice, along Sendero La Vieja and behind Centro Cientifico.

This species, though resembling sect. *Porphyrochitonium*, is actually a member of sect. *Decurrentia* or some other new section of *Anthurium*. It is distinguished by its long, slender, reddish brown internodes, semiglossy, ovate leaf blades with a sunken midrib and moderately obscure pale round punctations on the lower surface and by its small yellow-green spadix.

The species has no close relatives. It is one of the few species with ovate, epunctate blades that occur at elevations above 1,700 m.

Additional specimens examined: COLOMBIA. **Nariño:** Ipiales, Correg. de La Victoria, Río San Francisco-Río Manizales, 2,400 m, 15 Apr 1992, *B.R. Ramírez P. 4835* (MO PSO); Pasto Correg. de El Encano, Quebrada Orejuela, 2,900 m, 29 Dec 1991, *B.R. Ramírez P. et al. 4334* (MO PSO); Centro Cientifico, 01°05′N, 78°01′W, 1,780 m, 28 Jul 1988, *Croat 69634* (MO, PSO); Along Sendero La Vieja to "La Piña", 01°06′N, 77°54′W, 2,010–2,060 m, 11 Mar 1990, *Croat 71331* (HUA, MO, PSO). ECUADOR. **Carchi:** Espejo, El Gualtal, Cerro Golondrinas Hembra, 00°51′N, 78°08′W, 2,800 m, 21 Aug 1994, *W. Palacios 12473* (CM, MO, QCNE, US); El Goaltal, Cerro Golondrinas Hembra, 00°51′N, 78°08′W, 2,600–2,800 m, 20 Aug 1994, *W. Palacios 12446* (MO, QCNE); El Gualtal, Faldas de Cerro Golondrina Hembra, 00°51′N, 78°07′W, 2,450 m, 21 Aug 1994, *W. Palacios & J. Clark 12642* (CM, MO, NY, QCNE).

Anthurium longicaudatum Engl., *Bot. Jahrb. Syst.* 25:388. 1898. Type: ECUA-

DOR. Pallantanga near Pte de Chimba, *Sodiro s.n.* (QPLS).

Anthurium suborbiculare Sodiro, *Anales Univ. Centr. Ecuador* 15(108):15. 1901. Type: Ecuador., *Sodiro s.n.* (G, MO).

Terrestrial or epiphytic; **internodes** 1–1.5 cm long; 1.3–2.0 cm diam.; **cataphylls** 5–6 cm long, drying reddish brown, persisting intact at uppermost nodes, as a loose reticulum of tan or red fibers lower; **petioles** terete, (22–) 31–56 (–80) cm long (averaging 40.1 cm), 2–5 mm diam. at middle; **blades** ovate-elliptic, weakly cordate, caudate-acuminate at apex, weakly cordate at base, 19.5–37 cm long, 10–24 cm wide (averaging 28.7 × 18.5 cm), 1.5–2 times longer than broad, from half as long as to 1.1 times longer than the petioles, broadest between point of petiole attachment and middle, convex at margins, moderately thin; both surfaces glossy, drying olive; **anterior lobe** 19–38 cm long; **posterior lobes** 2–6 cm long, 2–6.5 cm wide; **sinus** arcuate to triangular, .5–5 cm deep, 3–5 cm wide; **midrib** convex, narrow, and scarcely paler above, round-raised, moderately paler and weakly ribbed below; **basal veins** 4–6 pairs, free to base; **primary lateral veins** over 20 per side, departing midrib at 45°–60° angles, ascending to collective vein, quilted-sunken above, narrow and pleated-raised below; **tertiary veins** in part sunken above, raised below; **collective vein** arising from base, 2–4 mm from margin. INFLORESCENCES erect, shorter than leaves; **peduncle** 22–55 cm long, 2–4 mm diam. at middle; **spathe** reflexed-spreading, chartaceous, green to violet-purple, lanceolate, 4–9 cm long, 1.0–1.5 cm wide; **spadix** reddish violet to maroon, moderately glossy, sessile, oblong, 8–21 cm long, 4–5 mm diam. INFRUCTESCENCES with **berries** purple.

Anthurium longicaudatum ranges from Colombia (Nariño) to Ecuador (Carchi, Cotopaxi, Esmeraldas, Imbabura, Pichincha) at elevations of 900–2,450 m in *Premontane wet forest*, *Premontane rain forest*, and *Tropical moist forest* life zones. It is moderately common in the regrowth forest at La Planada.

A member of sect. *Polyneurium*, this species is recognized by its terrestrial habit, short internodes glossy ovate-elliptic blades with a caudate-acuminate apex and with many primary lateral veins, as well as by the reddish violet spadix and purple berries.

This species is most easily confused with *A. cuspidatum*, but that species differs in having gradually acuminate apex, less broad ovate blades and not condensed primary lateral veins. *Anthurium longicaudatum* can be distinguished by its smaller, more ovate blade and sharply acuminate apex and more condensed primary lateral veins.

Additional specimens examined: COLOMBIA. **Nariño:** Ricaurte, La Planda, Salazar Finca 7 km above Ricaurte, 01°08′N, 77°58′W, 1,750 m, 29 Nov 1981, *Gentry 35195* (COL, MO); 01°09′37″N, 77°59′13″W, 1,850–1,950 m, 7 Jun 1996, *Bittner 2464* (MO, PSO); Base y cima de Cerro León, 01°10′18″N, 78°00′09″W, 2,148 m, 7 Mar 1997, *G. Herrera & Bittner 9421* (MO); 01°09′37″N, 77°59′13″W, *9165* (PSO), 01°09′37″N, 77°59′13″W, *9135* (PSO); 01°10′N, 77°58′W, 1,800 m, 2 Nov 1987, *Benavides 8797* (MO, PSO); Along road to Tumaco, 1,100 m, 13 Sep 1990, *Kress et al. 90-3059* (US); 1,800 m, 1 Apr 1992, *Restrepo 510* (MO); La Posada, 01°05′N, 78°01′W, 1,780 m, 26 Jul 1988, *Croat 69572* (B, COL, F, HUA, K, MO, NY, PSO, QCNE, SEL, UB, US); *69573A* (MO); 01°10′00″N, 77°55′00″W, 1,800 m, 1 Apr 1992, *Restrepo 510* (MO); Borde Celimo II, 01°10′00″N, 77°55′00″W, 1,800 m, 13 Nov 1993, *Restrepo 725* (MO). ECUADOR. **Carchi:** Río Blanco drainage above Chical, tributary of Río San Juan, 00°54′00″N, 78°11′58″W, 1,300–1,500 m, 25 Sep 1979, *Gentry & G. Schupp 26556* (SEL, MO); Cerro Golondrinas, Upper Río Gualpí headwaters,00°50′N, 78°13′W, 2,250–2,265 m, 15–20 Jul 1993, *B. Boyle, P. Chamorro, M. Fleury, P. Hibbs & M. Quer 2184* (K, MEXU, MO, QCNE); Vicinity of El Chical, along road to El Carmen3.6–4.6 km up road to El Carmen, 1,435–1,503 m, 00°55′19″N, 78°21′14″W, 17 Feb 2005, *Croat 94762* (MO, QCNE); *94810* (MO, QCNE); Maldonado, Tobar Donoso

Fig. 13. a. *Anthurium longicaudatum* Engl. (*Croat 69572*). a. Habit. b. *Anthurium martae* Croat & Castaño Rubiano. (*Croat 71218*). b. Habit. c. *Anthurium melampyi* Croat. (*Croat 69565*). c. Habit. d. *Anthurium nestorpazii* Croat & P. Huang. (*Paz 345*). d. Herbarium specimen.

00°55′N, 78°32′W, 900 m, 22 Nov 1992, *C. Aulestia, E. Aulestia & M. Guanga 664* (MO); Vic. Maldonado, 00°54′00″N, 78°06′00″W, 1,800 m, 15 Apr. 1977, *M. T. Madison 4000* (SEL, MO); Campamento Machines 00°50′32″N, 78°03′51″W, 2,200–2,400 m, 28 Feb 1974, *G. Harling & L. Andersson 12306* (GB, MO); Valle de Maldonado: km 71 on road Tulcán-Maldonado, 00°54′N, 78°06′W, 2,100–2,200 m, 20 May 1973, *L.B. Holm-Nielsen, et al. 6008* (AAU); Espejo, El Gualtal, Faldas de Cerro Golondrina Hembra, 00°51′N, 78°07′W, 2,450 m, 21 Aug 1994, *W. Palacios 12618* (CM, MO, QCNE); Mira, Norte del Carmen, camino a Chical, 00°51′N, 78°13′W, 2,000–2,200 m, 10 Feb 1992, *W. Palacios et al. 9708* (MO); *9820* (MO, US); Tulcan, Arriba de Maldonado, Frontera con Colombia, Sitio Chilmá, 00°51′N, 78°02′W, 2,000 m, 20 May 1991, *W. Palacios & D. Rubio 7305* (MO); Tobar Donoso; Centro El Baboso, 00°53′N, 78°25′W, 1,800 m, 17–27 Aug 1992, *G. Tipaz et al. 1784* (MO).

Anthurium martae Croat & Castaño Rubiano, **nom. & stat. nov.**

Type: VENEZUELA. Lara. Parque Nacional Yacambú, ca. 9 km. S. of Sanare, 1 km inside entrance to park; primary cloud forest, ca. 9°43′N, 69°37W, 1,790 m, *Croat 54687* (holotype, MO-2934936; isotypes B, COL, F, K, MY, NY, RSA, US, VEN).

A. humboldtianum Schott var. *viridispadix* Croat, Aroideana 9:36, figs. 64–65. 1986

Terrestrial to hemiepiphytic, sometimes terrestrial in juvenile stage, usually scandent and climbing to 4–6 m ; **internodes** 2–15 cm long, 1–3.5 cm diam., dark green, speckled and weakly glossy becoming gray-brown; **cataphylls** 10–27 cm long,

thick but soon turning thin, persisting brownish and semi-intact at upper nodes, sometimes scarcely fibrous but usually persisting as a loose network of pale fibers closely appressed to the stem, eventually deciduous; **petioles** terete, 58–83 (–200) cm long (averaging 69.8 cm), 5–9 mm diam., dark green, matte, sometimes tinged reddish, very weakly sulcate and rarely weakly striate adaxially, flexible; **blades** ovate-sagittate with basal lobes often overlapping, broadest slightly above the petiole attachment, (33–) 44–76 (–120) cm long, (20–) 24–48 cm wide (averaging 63 × 39 cm), 1.5–2.1 times longer than wide, .7–.9 times as long as petioles, subcoriaceous, dark green and matte-subvelvety above, moderately paler and matte below; **midrib** thicker than broad and slightly paler above, round-raised and paler below; **primary lateral veins** (6–) 10–12 (–14) pairs, narrowly raised and paler above, more or less round-raised below, arising usually at an acute angle then spreading at 45–65°, sometimes at up to 80° angle; **basal veins** (6–) 8–10 pairs, the first (1–) 2–3 free to the base, the remainder coalesced to varying degrees and regularly branching from the posterior rib; **posterior rib** naked (1–) 3–5 (–9) cm along sinus; **tertiary veins** prominulous in part below; **collective veins** arising usually from one of the middle or even upper primary lateral veins but often from the 1st pair of basal veins, sometimes from the 2nd pair of basal veins, mostly 4–10 mm from margins, sometimes 2 mm or up to 1.5 cm from margin. INFLORESCENCES erect-spreading; **peduncle** terete, medium-green, matte, 34–70 cm long, 4–7 mm diam.; **spathe** linear-lanceolate, 13–30 cm long, 1–3 cm wide, medium green or greenish white, erect then reflexed, brittle; **spadix** 14–26 cm long 5–8 mm diam., green, greenish yellow eventually turning purplish violet, semiglossy, usually stipitate 4–6 mm, rarely to 2–2.5 cm in flower (more commonly stipitate 1–2 cm long in fruit); **pollen** white; **pistils** early weak-emergent. INFRUCTESCENCE with stipe to 2 cm long, **fruiting spadix** to 50 cm long, 2.5–3 cm diam.; **berries** green.

Anthurium martae occurs in Venezuela (Aragua, Lara, Merida, Tachira, Trujillo) and Colombia (Antioquia, Boyaca, Caldas, Cauca, Cundinamara, Huila, Magdalena, Meta, Norte De Santander, Nariño, Putumayo, Quindio, Risaralda, Tolima, Valle del Cauca), at elevations of 1,800–3,900 m, primarily above 2,200 m, in *Lower montane wet forest, Montane wet forest, Premontane wet forest* and *Premontane rain forest* life zones.

A member of sect. *Cardiolonchium*, this species is recognized by its often scandent habit, network of long cataphyll fibers persisting tightly appressed to the stems, by the long petioles about as long as the blades, the ovate-sagittate, matte-subvelvety, green-drying blades with collective vein originating from one of the first basal veins or even from a primary lateral vein as well as by the green, lanceolate spathe and the yellowish green spadix.

Anthurium martae is perhaps closest to *A. nigrescens* owing to the long internodes, blade shape, and prominent tertiary veins. That species differs in having generally smaller blades which dry more or less blackened and have the collective veins arising from one of the lowermost primary lateral veins.

It also can be confused with another species, perhaps an undescribed species represented by *Idrobo & O. Rangel 10903* from Tolima at 3,700 m elevation. It differs in having shorter internodes and much smaller leaves but the leaves dry with the same color and texture and the stem has the same kind of persistent, semi-intact cataphyll fibers.

Croat & Galeano 70757 from Parque Regional Ucumarí at 1,900 m is similar to *A. martae* but differs in having short, thick internodes 3–6 cm in diam. and in having a dark green spadix. It perhaps represents another new species.

Kirkbride & Forero 1865 from the Sierra de Santa Marta in Magdalena Province is related to *A. martae* but differs in having collective veins very close to the margin.

Alvaro Fernández Pérez 5833 from Meta Dept. at Paletará at 2,800–2,900 m appears also to be *A. martae* but the tertiary

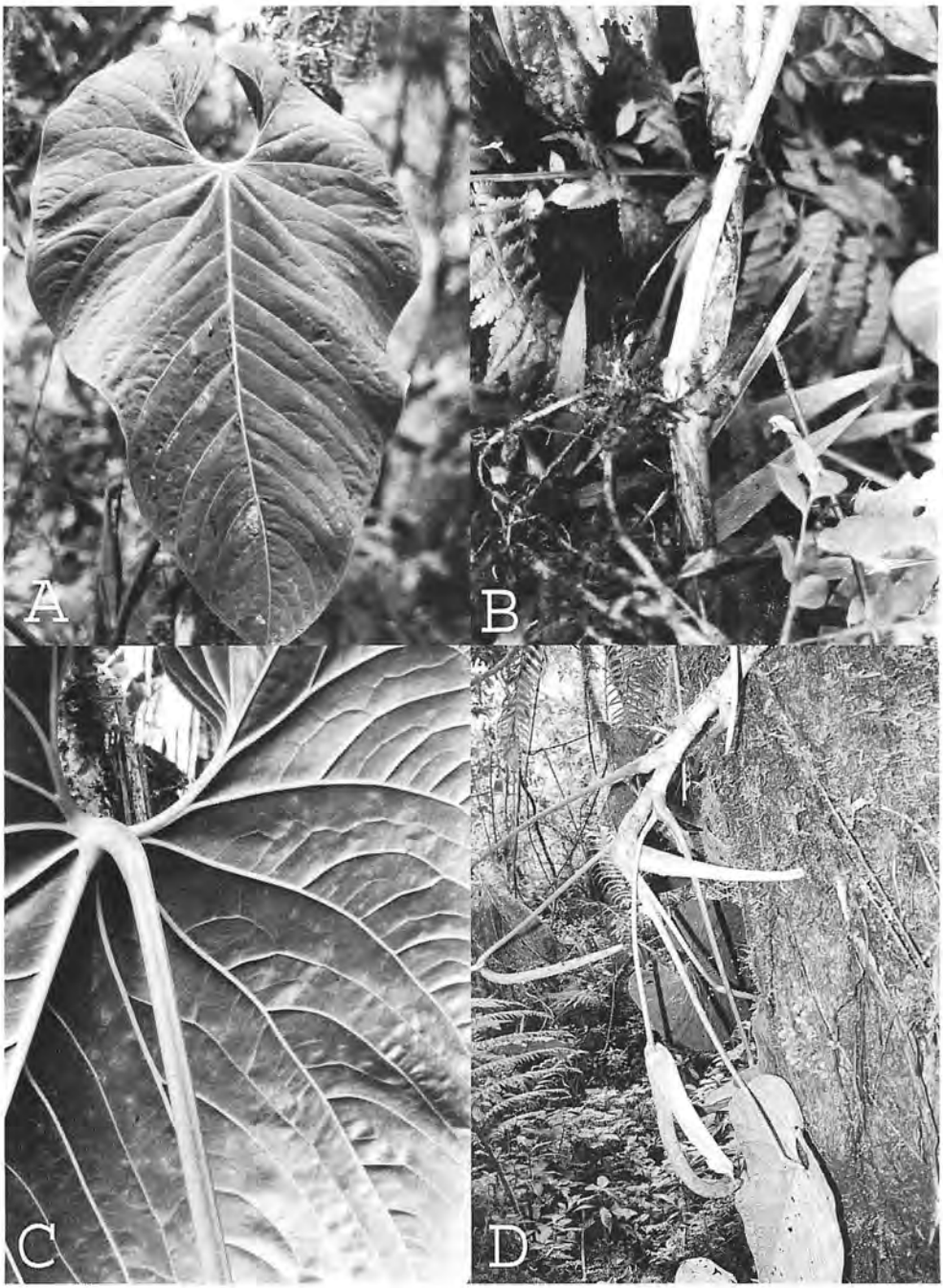

Fig. 14. a–d. *Anthurium martae* Croat & Castaño Rubiano. (*Croat 71218*). a. Habit with leaf blade, adaxial surface. b. Stem showing long internodes. c. Leaf blade, abaxial surface showing venation. d. Inflorescence and infructescence.

venation on the lower surface is more conspicuously raised than any other specimen and it may represent another species.

The species was first collected by Luis Eduardo Mora in February, 1953 in the Valle de Sibundoy in Putumayo and Mélida de Fraume collected several collections in Caldas Dept. in the mid 1980s but most collections were made since 1989 when Marta Patricia Galeano and others including Al Gentry and O. Rangel made many collections in Parque Regional Ucumarí. The species is named in honor of Marta Patricia Galeano, curator of the Araceae at the Universidad Nacional de Colombia and a teacher at the Universidad Javeriana, hence the name *A. martae*.

Anthurium martae is a redescription of *A. humboldtianum* Schott ssp. *viridispadix* Croat. That taxon was described from Venezuela and was at the time believed to be merely a subspecies of *A. humboltianum* Schott but the taxon has subsequently been found to be a widespread and distinct taxon, better separated at the specific level. It is being assigned the new name *A. martae*.

Paratypes: COLOMBIA: Parque Nacional Natural Los Nevados, Cañón del Río Combeima, 2,600 m, 24 Jun 1985, *César Barbosa C. 3259* (COL). **Boyaca**: Sogamoso y Pajarite, 2,100 m, 12 Mar 1980, *H.Y. Bernal 373* (COL); Cordillera Oriental, below La Playa, Sierra Nevada del Cocuy, 3,250 m, 11 Sep 1957, *P.J. Grubb, B.A.B. Curry & A. Fernandez-Perez 795* (COL, US); Soata, Onzaga, quebrada de San Francisco, 2,600–2,660 m, 2 Aug 1958, *R. Jaramillo M. 815* (COL). **Caldas**: La Esperanza, Reserva Torre Cuatro, 05°01'45"N, 75°23'27"W, 2,900 m, 26 Mar 1999, *Alvear-P. M. et al. 280* (COL); 2,800–2,900 m, 26 Mar 1999, *278* (COL); Manizales, Monteleón, Cordillera Central, 2,250 m, 29 Sep 1984, *Mélida de Fraume, M. Álvarez & J. H. Gallego 278* (MO), *155* (MO), *47* (MO), *209* (MO), *175* (MO), *185* (MO); Manizales, Monteleón, Cordillera Central, 2,250 m, 2 May 1985, 3 Aug 1985, *593* (MO). **Cundinamarca**: Montes de El Ermitaño, W of Salto de Tequendama, 2,300 m, 14 Sep 1959, *Lorenzo Uribe Uribe 3370* (US); SW of Bogotá on toll road to Silvania, 2,700 m, 19 May 1972, *A.S. Barclay et al. 3429* (COL); Sasaima, Vereda La Victoria, Hacienda Gualivá, Peñas del Aserradero, 2,300–2,900 m, 18–19 Oct 1954, *H. García-Barriga 15320* (COL); Cabrera, 03°58'41"N, 74°29'09"W, 30 Sep–01 Oct 1989, *C.E. Barbosa 5909* (COL); Fomeque, faldas del Páramo de Chingaza, 2,800 m, 25 Jan 1963, *G. Huertas & Camargo 5556* (COL). **Huila**: Finca Merenberg, E of Volcán Puracé, near Cauca border, Transect 6, 02°16'N, 76°12'W, 2,280 m, 2 Apr 1986, *Gentry, E. Zardini & M. Monsalve 53918* (MO). **Magdalena**: Santa Marta, Sierra Nevada de Santa Mata, 10°55'N, 73°57'W, 2,500–2,650 m, 4 Aug 1972, *Joseph H. Kirkbride 1865* (COL). **Meta:** Paletará, 2,800–2,900 m, 30 July 1961, *A. Fernández-Pérez 5833* (COL). **Nariño:** COLOMBIA. Ricaurte, La Planada, Borde Pialapí, 8 Jul 1992, *Restrepo 567* (MO);,1,800 m, 13 Aug 1993, *588* (MO); Trail "La Pina" to Mirador, 01°09'37"N, 077°59'13"W, 1,850 m, 18 Jul 1996, *Bittner 2625* (MO); Along Sendero Vieja, along ridge top in direction of La Pina, 1°06'N, 77°54'W, 1,950–2,010 m, 9 Mar 1990, *Croat 71218* (MO). **Norte de Santander**: Cordillera Oriental, Río Chitaga, 2,000–2,550 m, 10 Aug 1968, *L.E. Mora-Osejo 4577* (COL). **Putumayo**: Comisaria del Putumayo, En el Valle de Sibundoy, 2,200 m, 06 Feb 1953, *L.E. Mora-Osejo 1009* (COL). **Quindio**: Camino finca Servia-Valle Chiquito, 2,400–3,900 m, 30 Apr 1990, *N.C. Vélez et al. 1550* (COL); Pijao, Vereda El Espartillal, 3,000 m, Feb 1995, *N.C. Vélez, M.L. Chacón 4991* (COL); Salento, Camino de Navarco a La Línea, cerca a la finca, 2,900 m, 23 Nov 1990, *G.A. Galeano et al. 2196* (COL); Estación La Montaña, 2,920 m, Sep 1992, *J. Betancur B. et al. 3775* (COL); Estación La Montaña, 2,850 m, 10 Oct 1992, *P. Franco et al. 4093* (COL); Navarco, 3,000 m, 24 Sep 1992, *3966* (COL); Navarco, cerca al Alto de la Línea, 3,000 m, Sep 1992, *3664* (COL), *3576* (COL), *3605* (COL),. . *3609* (COL), *3643* (COL). **Risaralda**: Apia - Pueblo Rico (NW of Pereira), 14 km NW of Apia, 16 km of Pueblo Rico, 05°10'38"N, 76°02'37"W, 1,890 m, 21 Feb 1990, *Croat 70827* (MO);

El Cedral, trail to El Silento, 20 km of Pereira, 2,140 m, 15 Oct 1989, *O. Rangel & Gentry 5701* (COL, MO); La Pastora, Reserva Ucumarí, 2,620 m, 13 Oct 1989, *O. Rangel et al. 5658* (MO, *5620* (COL), *5573* (COL), *5525* (COL), *5429* (COL); *O. Rangel et al. 5330* (COL), *5923* (COL); El Cedral, trail to El Silento, 2,140 m, 15 Oct 1989, *5738* (COL); La Pastora, Reserva Ucumarí, 05°06′47″N, 75°53′16″W, 2,610 m, 11 Oct 1989, *5421* (MO), *5331* (COL, MO); Ucumarí, El Cedral, trail to El Silento, 20 km of Pereira, 2,140 m, 15 Oct 1989, *5816* (MO); Mistrato, ca 12 km NE of town center, 05°17′58″N, 75°53′15″W, 1,800–1,900 m, 17 Mar 1991, *Galeano, G. et al. 2375* (MO); Pereira, Parque Regional Ucumarí, Vereda La Pastora, trail from El Cedra to La Pastora vic. El Cedral, 04°02′N, 75°30′W, 1,900 m, 19 Feb 1990, *Croat & M. P. Galeano 70755* (COL, MO); Vereda La Pastora, trail from La Pastora to Laguna del Otún, Peña Bonita, 2,560 m, 26 Jul 1989, *M.P. Galeano 146* (COL); El Ceilán - El Cedral, 2,340 m, 30 Jul 1989, *M.P. Galeano 221* (COL); 2,450 m, 27 July 1989, *M.P. Galeano 162* (COL); *151* (COL); Parque Natural Regional Ucumarí, 12 Jun 1989, *F. González et al. 1567* (COL); 2,400 m, 2 Dec 1989, *P. Franco, O. Rangel, E. Londoño 2757* (COL); 2,680 m, 13 Jun 1989, *R. Bernal et al. 1628* (COL); 2,700–3,000 m, 25 Nov 1989, *G.A. Galeano et al. 2181* (COL). **Tolima**: Municipio de Murrillo, Vereda La Cabaña, 3,700 m, 9–10 Aug 1980, *J.M. Idrobo, O. Rangel 10903* (COL); Roncesvalles, a la orilla de la trocha hacia San José de Las Hermosas, 2,800 m, 19 Nov 1980, *L.A. Camargo 7679* (COL); Santa Isabel, Vertiente Oriental, TPN L 39, 3,100 m, 15 Feb 1980, *R. Jaramillo M. et al. 6424* (COL). **Valle del Cauca**: Andalucia, Vda. Altaflor, Cañada los Tambores, 1,700 m, 9 Jun 1982, *L.A. Millan 83* (MO)' Cali, Finca Zingara 1,900 m, 2 Oct 1994, *Jorge Giraldo Gensini 617* (MO).

Anthurium melampyi Croat **sp. nov.** Type: COLOMBIA. Nariño: La Planada, 7 km above Chucunés, on road between Tuquerres and Ricaurte, re-growth secondary forest with elements of primary forest, on trail above La Posada, *Croat 69565* (holotype, MO-3621874–85, 4369444; isotypes, AAU, B, CAS, COL, CUVC, F, G, HUA, K, M, NY, PSO, QCNE, S, SEL, UB, US, VEN).

Internodis brevis, 4–7 cm diam.; cataphylla 30 cm longa; petiolus 100–140 cm longus, 8–14 mm diam.; lamina ovato-cordata, 70–130 cm longa, 50–95 cm lata; nervis primariis lateralibus 17–23 utroque; spatha 12–28 cm longa, 3–7 cm lata, viridis; spadix luteo-albus aut viridis, 16–48 cm longus; baccae rubro-purpureae.

Epiphytic (often appressed), or less commonly terrestrial; **juvenile plant** with **petiole** 24–32 cm long, 1–3 mm diam. at middle; **blade** triangular-ovate, 8–22 cm long, 3–16 cm wide; **adults internodes** short, 4–7 cm diam.; **cataphylls** reddish brown above, pale below, drying brown intact, tan as fibers, to ca. 30 cm long, persisting semi-intact at upper nodes, as nearly linear fibers lower, or as a loose reticulum of fibers, occasionally with tips persisting intact; **petioles** 100–140 cm long (averaging 131.2 cm), 8–14 mm diam. at middle, terete, deeply and narrowly sulcate or sharply V-sulcate, especially in age, sometimes with acute striations adaxially or with 2–many coarse ribs in age, semiglossy, brittle, medium green; geniculum 1.5–4 cm long; **blades** ovate-sagittate, acuminate at apex, deeply lobed at base cordate or cordate-sagittate at base, 70–130 cm long, 50–95 cm wide (averaging 96.5 × 78.4 cm), 1.6–2.1 times longer than broad, .8–1.0 times longer than the petioles, broadest at or near point of petiole attachment, subcoriaceous; both surfaces semiglossy, bicolorous, drying reddish brown; **anterior lobe** 60–100 cm long, 50–95 cm wide, concave along the margin; **posterior lobes** 22–45 cm long, 20–47 cm wide, directed inward; **sinus** obovate, often closed, 20–38 cm deep, (6) 22–26 cm wide; **midrib** acute and slightly paler above, round-raised, often with parallel ridges, and somewhat paler below; **basal veins** 9–11 pair, 7th and higher

Fig. 15. a–d. *Anthurium melampyi* Croat. (*Croat 69565*). a. Leaf blade, adaxial surface. b. Leaf blade, abaxial surface. c. Stem showing cataphylls and base of petioles. d. Inflorescence and infructescence.

Fig. 16. a–b. *Anthurium melampyi* Croat. (*Croat 69565*). a. Inflorescence showing spathe and spadix. b. Close-up of spadix. c–d. *Anthurium microspadix* Schott. (*Croat 69636A*). c. Fresh, unmounted specimen showing stem, leaves and inflorescence. d. Inflorescence showing spathe and spadix.

coalesced to varying degrees, prominently raised below, sunken above, at least upon drying; **posterior rib** prominent, mostly naked; **primary lateral veins** 17–23 per side, departing midrib at 45°–60° (90°) angles, slightly paler and narrowly raised in valleys above, thicker than broad to narrowly raised, and paler below; **tertiary veins** often sunken above, raised below; **collective vein** arising near base, from one of last basal veins, extending along most of the margin, 1–5 mm from margin; INFLORESCENCES erect-spreading to spreading-pendent; **peduncle** 45–80 cm long, 5–10 mm diam. at middle; **spathe** oblong, oblong-elliptic, or rarely lanceolate, subcoriaceous, 12–28 cm long, 3–7 cm wide, hooding spadix, sometimes somewhat curled, green, with moderately distinct veins; **spadix** yellowish white or green, tinged faintly purple pre-anthesis, cylindroid to slightly tapered, pendent, slightly curved away from spathe at 80°–90° angles to peduncle, stipitate, 16–48 cm long, .6–1.0 cm diam. at base, 1.5–1.9 cm diam. just above base, .9–1.5 cm diam. at middle, .6–1.0 cm diam. at apex. Flowers 1.6–2.0 mm long, 1.8–2.1 mm wide, 10–12 per spiral; tepals triangular; stamens long-exserted; pistils early emergent INFRUCTESCENCES long-pendent; **fruiting spadix** 50–65 cm long, 2.5 cm or more in diam. at base, to 3 cm diam. at middle, 1.4 cm diam. at apex; tepals blackened; **berries** reddish-purple, green at tip.

Anthurium melampyi is known only from southern Colombia (Nariño) at the type locality and in adjacent area of Ecuador (Carchi), at elevations from 750–2,420 m, primarily above 1,800 m, in *Premontane wet forest, Montane rain forest* life zones. In Carchi it has been collected in the Tobar Donoso parish in the Awá Reserve. At La Planada it is common in all parts of the area, occurring in both regrowth forest and in the primary forest.

A member of sect. *Belolonchium*, this species is characterized by its short internodes, persistent reddish brown cataphyll fibers, terete, deeply and narrowly sulcate or sharply V-sulcate petioles, large size ovate-sagittate blades with 9–11 pair of basal veins, a prominently naked posterior rib, 25–30 pair of primary lateral veins, the collective veins arising from near the base as well as by the long-pedunculate inflorescence with the hooding green spathe and the yellowish white, cylindroid to slightly tapered spadix with emergent stamens.

Anthurium melampyi could be confused with other members of the sect. *Belolonchium*, especially *A. striatipes*, but that species differs in having fewer primary lateral veins and a less regular collective vein which is considerably further from the margin. It could also be confused with *A. bogotense*, but that species is clearly distinct because its collective veins usually originate from one of the primary lateral veins above the middle of the blade and have the primary lateral veins on the lower surface of the blade totally glabrous and with an acute medial rib. In contrast *A. melampyi* have collective veins that arise from one of the lowermost basal veins and have at least the primary lateral veins minutely and densely granular to granular-puberulent (at least on drying).

Anthurium melampyi is also similar to *A. betanianum* Croat, a species currently known only from the Paramo de Tama along the eastern border of Venezuela near Colombia. While both species have very similar leaves, *A. betanianum* differs in having cataphyll fibers which are finer and more reddish brown, while petioles are unribbed with a medial rib adaxially, becoming flattened toward the apex, versus coarsely many ribbed (at least at the base) and obtusely to sharply V-sulcate.

The published drawing of *Anthurium obpyramidale* Leimbeck & Croat described from southeastern Ecuador looks very similar to *A. melampyi* but that species has the collective veins arising from the 1st basal vein or from one of the primary lateral veins and the collective veins are irregularly loop-connected. In contrast the collective veins of *A. melampyi* arise from one of the lowermost basal veins and runs regularly close to the margin all the way to the apex. In addition, the blades of *A. obpyriforme* dry gray on the upper surface and

pale grayish brown on the lower surface instead of medium yellow-brown on the upper surface and dark yellow-brown on the lower surface on *A. melampyi*.

Anthurium melampyi is also closely related to another new species from Carchi Province in Ecuador represented by *Besse et al. 2264* and *2296* as well as *Madison 3989* and *4001* from the Tulcan-Maldonado Road, between 1,800 and 2,300 m elevation. That species differs in having a purplish to pinkish red spadix rather than a greenish spadix.

At La Planada, it is only to be confused with *A. esmeraldense*, which has similar leaves, but that species is a member of sect. *Calomystrium* with persistent, intact cataphylls, a more hooded spathe and blades with conspicuously paler major veins on the upper surface.

A few collections (*Gentry 30540, 30545, and 30565*) of *A. melampyi* have blades which dry somewhat more grayish with a spathe drying slightly thicker and somewhat more grayish. However, these specimens lack adequate field notes so it is difficult to ascertain whether they represent another species.

Another unusual collecton is *Croat 71172*, which has petioles with a sharply V-shaped sulcus with acute striations in the adaxial half of the petioles, compared with a smoothly, deeply, and narrowly sunken sulcus on typical material. However, all other aspects of the plant seem to fit typical material of the species well.

Spathe shape is quite variable for the species with most having spathes 4.3–5.5 times longer than wide, but with some collections (*Croat 69565* (sheet 9) and *Croat 71172*) having spathes 9–10 times longer than wide.

This species was named in honor of Michael Melampy, an old friend who collected a lot of plants while a Peace Corps Volunteer in Colombia. He is now a professor at Baldwin-Wallace College in Berea, Ohio. Along with Al Gentry, Sue Libenson, Nance Hite, Mitch Olson and Alvaro Cogollo, Michael was the first to collect this new species in 1981.

Paratypes: COLOMBIA. **Nariño:** Ricaurte, Finca La Planada, near Chucunés, 1,950 m, 13 Jan 1981, *Gentry et al. 30540* (COL, MO) *30545* (COL, MO) *30565* (COL, MO *30601* (MO); Salazar Finca 7 km above Ricaurte, 01°08′N, 77°58′W, 1,750 m, 26 Nov 1981, *Gentry 35049* (COL, MO); Sendero "Al Rondon", 01°09′37″N, 77°59′13″W, 1,850–1,950 m, 19 June 1996, *Bittner et al. 2556* (MO, PSO), *2549* (MO, PSO); 01°10′N, 77°58′W, 1,800 m, 1987, *Benavides 8622* (PSO); 01°09′37″N, 77°59′13″W, *Bittner et al. 2601* (PSO); 19 Jun 1996, 2556 (PSO); 01°09′37″N, 77°59′13″W, *G. Herrera 9414* (PSO); Borde Marcos, 01°34′41″N, 77°30′48″W, 1,800 m, 15 Nov 1993, *Restrepo & A. Ortega 740* (MO); Trail "La Pina" to Mirador, 01°09′37″N, 77°59′13″W, 1,850 m, 18 Jul 1996, *Bittner 2628* (MO); Trail above La Posada, 01°05′N, 78°01′W, 1,780 m, 26 Jul 1988, *Croat 69569A* (MO, PSO); Along Sendero La Vieja, 01°06′N, 77°54′W, 1,780–1,850 m, 7 Mar 1990, *Croat 71172* (AAU, B, COL, F, GB, HUA, K, MO, PSO, S, US); 01°10′N, 77°58′W, 1,800 m, 1 Nov 1987, *Benavides 8682* (MO, PSO, COL), *8696* (COL, HUA, MO, PSO); 13 Feb 1988, *9228* (PSO); 26 Sep 1989, *10893* (PSO); 27 Sep 1989, *10943* (PSO); Sep 27 1989, *10944* (PSO); 17 Jan 1990, *112231* (PSO); *11225* (PSO); 01°10′00″N, 77°55′00″W, 1,800 m, 15 Nov 1993, *Restrepo & Ortega 740* (MO); 01°05′N, 78°01′W, 7 Jan 1988, *Gentry et al. 60554* (MO); 4 Jan 1989, *Gentry et al. 64466* (PSO); Corregimiento de Chucunés, Vertiente Occidental, 01°10′27″N, 77°58′47″W, 1,800 m, 3 Aug. 1992, *N. Paz. 310* (CUVC); Municipio Ricaurte, camino Las Cruces-Curcuel, 1°08′N, 77°51′W, 5 Nov 1995, *B.R. Ramírez P et al. 8691* (QCA). ECUADOR. **Carchi:** From Goatal at 1,100 m, hike past Santa Rosa and up to El Corazon at 2,150 m (about six hours), 00°48′57″N, 78°07′01″W, 2,150–2,420 m, 10 Jun 1993, *J. Bradford et al. 93* (MO); N side of Río Mira, across from Lita, steep N-facing slope directly across from Baboso, on S side of Río Baboso, 00°53′N, 78°27′W, 750 m, 11 Aug 1994, *B. Boyle & A. Boyle 3524* (MO); Tulcan, Reserva Indígena Awá, Parroquia Tobar Donoso, sector El Baboso,

0°53'N, 78°20'W, 1,600 m, 03 Oct 1991, *Galo Tipaz et al. 271* (MO).

Anthurium membranaceum Sodiro, *Anales Univ. Centr.* Ecuador 19(136): 294. 1905. Type: ECUADOR. Esmeraldas: Río Cachabí, near Ventanas, Aug. 1904, *Sodiro* s.n. (holotype, G).

Anthurium crebrinerve Sodiro, Anal. Univ. Centr. Ecuador 15(108):10. 1901. Type: ECUADOR. Pichincha: Nanegal, (holotype, B; isotype, G).

Anthurium ochreatum Sodiro, var. *membranaceum* (Sodiro) Sodiro, Anales Univ. Centr. Ecuador 19:315. 1905. Type: ECUADOR: Esmeraldas: Río Cachabí near Ventanas, *Sodiro s. n.* (not seen).

Epiphyte or terrestrial; **stem** 20–100 cm long; **internodes** 1–4 cm long, (0.5–) 1–1.5 (–3) cm diam., medium green, semiglossy; **cataphylls** marcescent with fragments of epidermis remaining; **petiole** 18–55 cm (averaging 33) long, 2–9 mm diam., .9–2.4 (averaging 1.5 cm), sharply and narrowly flattened, sometimes subterete with weak, sometimes subterete with a medial rib or with acute marginal ribs, matte or weakly semiglossy, medium green; geniculum 5–35 mm long, 3–9 mm diam.; **blades** pendent, 34–72 (–80) cm 13–26 (–33) cm wide, (averaging 47 × 19 cm) (2.1–) 2.5–3.3 (averaging 2.7) longer than wide, 1.2–1.8 times longer than petioles, elliptic to narrowly ovate, narrowly acuminate at apex, acute, obtuse to cuneate or rounded at base, thinly coriaceous, moderately bicolorous, dark green above, paler below, matte to semiglossy on both surfaces; **midrib** narrow, convex and slightly pale above, convex, more prominently raised and paler below; **primary lateral veins** 15–27 pairs, spreading at 50–60° angle in the middle of the blade, to 70° near the base, narrowly sunken above, raised below, concolorous; minor veins quilted, weakly sunken above, weakly raised below; **basal veins** 3 free to base, outermost extending to blade margin, at times forming collective veins, the inner pair of basal veins usually forming the collective veins, .4–1 cm from the margin; the middle pair of basal veins also at times forming a collective vein ca. 3 mm from margin. INFLORESCENCES erect to erect-spreading; **peduncle** terete, erect, pale green, 5.5–28 cm long (averaging 20) long, 2–4 mm diam.; **spathe** lanceolate, 7.5–20 cm long, 1.5–2 cm wide, broadest near the base, pale green to pale yellow, reflexed or reflexed-spreading, semiglossy outside, glossy inside; **spadix** gradually tapered to the rather pointed apex, pale yellow, greenish yellow, yellow-green, pale green or creamy white, sometimes tinged with purple, glossy, nearly sessile, 6–28 cm (averaging 12.5 cm) long, 5–7 mm diam. Flowers 5–7 on principal spiral, 2.0–2.3 mm long, 1.6–1.8 mm wide. INFRUCTESCENCES with **berries** yellow-green.

Anthurium membranaceum is known from Colombia (Nariño) to Ecuador (Carchi, Esmeraldas), at elevations of 100 to 2,000 m (in Nariño and Carchi mostly above 1,200 m, and in Esmeraldas mostly below 800 m) in *Tropical moist forest*, *Premontane wet forest*, *Tropical wet forest*, *Premontane rain forest* and *Lower montane wet forest* life zones. In Carchi it is found at Gualpí Chico, Tulcan Cantón above Maldanado, Gualpí Medio (900 m) and in Esmeraldas it is found in Parroquia Tobar Donoso in the Awá Reserve. It is common in both the regrowth forest and primary forest at La Planada.

A member of sect. *Xialophyllium*, the species is recognized by its moderately short internodes, large thin, narrowly elliptic to narrowly ovate or oblong-elliptic, matte blades with numerous, close, primary lateral veins, and greenish-yellow spadix. It differs from most other species in that section in having larger leaves, shorter and proportionately thicker internodes, and numerous, closely spaced primary lateral veins.

Anthurium membranaceum can be most easily confused with *A. ochreatum*, which differs in having relatively smaller blades which are subcordate at base, whereas *A. membranaceum* has large eliptic blades with obtuse or round base.

Fig. 17. a–d. *Anthurium membranaceum* Sodiro. (*Croat 69570*). a. Habit. b. Leaf blade, adaxial surface. c. Inflorescence showing spathe and spadix. d. Infructescence showing spathe and spadix.

Additional specimens examined: COLOMBIA. **Narino**: Reserva Natural Río Ñambí, 02 Sep 1997, *Pipoly et al. 21192* (PSO); La Planada, 01°10′N, 77°58′W, 16 Jan 1990, *Benavides 11137* (MO, PSO); 01°10′N, 77°58′W, 1,800 m, 25 Sep 1989, *10777* (MO, PSO); 26 Sep 1989, *10864* (MO); Nov 1987, *8795* (MO); Valley of Río Guiza, road from El Espino to Tumaco, ca. 21 km W of Ricaurte, 01°15′N, 78°07′W, 1,000 m, *Hammel 17145* (MO, NY); Above La Posada 01°05′N, 78°01′W, 1,780 m, 26 Jul 1988, *Croat 69570* (AAU, CAS, COL, HUA, GH, K, L, MEXU, MO, NY, P, QCA, SEL, US, VEN); Mpo. Altaquer, vereda de La Armada, 01°18′00″N, 078°04′00″W, 1,150 m, 11 Nov 1967, *Mora 3990* (COL, MO); Río Imbi Valley: Pasto–Tumaco, vicinity of "Palmar," 3 km NW of Ricaurte, 01°08′N, 77°56′W, 1,100 m, 14 Mar 1990, *Croat 71416* (CM, COL, HUA, MEXU, MO, US); Barbacoas, Río Nambi, Corregimiento Altaquer, Vereda El Barro, 01°18′N, 78°08′W, 1,325 m, 4 Dec 1993, *Franco et al. 4849* (MO, P); *4861* (MO); 01°06′00″N, 077°53′00″W, 1,950 m, 13 Jan 1981, *Gentry et al. 30534* (MO); *30571A* (MO); Salazar Finca, 01°08′N, 077°58′W, 1,750 m, 26 Nov 1981, *35047* (MO); Sendero La Vieja 01°09′37″N, 77°59′13″W, 1,850–2,000 M, 21 Jun 1996, *J. Bittner et al. 2593* (MO, PSO); 11 Feb 1997, *2733* (PSO); *2594* (MO, PSO); Al Rondon, 01°09′37″N, 77°59′13″W, 1,850–1,950 m, 19 Jun 1996, *2520* (MO, PSO); *2517* (MO, PSO); *2523* (MO, PSO); *2521* (MO, PSO); *2553* (MO, PSO); 1,300 m, 12 Apr 1941, *Sneidern 576* (COL); 01°10′N, 77°58′W, 1,800 m, 1 Nov 1987, *Benavides 8676* (MO); 1,900 m, 28 Nov 1976, *754* (MO); 01°10′00″N, 77°55′00″W, 1,800 m, 13 Nov 1993, *Restrepo 679* (MO); Ricaurte, 01°05′N, 78°01′W, 1,800 m, 21 Dec 1987, *Gentry et al. 59657* (COL, CM, MO); 7 km from Tumaco-Pasto road, 01°10′N, 77°58′W, 1,800 m, 24 Jul 1986, *Gentry & Benavides 55023* (PSO). ECUADOR. **Carchi**: Ascent of Río Verde, 00°52′N, 78°17′W, 1,900 m, 30 Nov 1987, *Hoover 2113* (MO, QCA); vic. Maldonado, 00°54′00″N, 78°06′00″W, 1,800 m, 15 Apr 1977, *Madison 3996* (QCA, MO); Tobar Donoso, Reserva Etnica Awá, Sabalera, 00°55′N, 78°32′W, 900 m, 22 Nov 1992, *Carlos Aulestia. et al. 633* (MO); El Pailon, ca. 45 km below Maldonado, 01°02′49″N, 78°22′05″W, 800 m, 26 Nov 1979, *Madison & L. Besse 7032* (SEL, MO); 00°54′00″N, 78°06′00″W, 1,450–1,650 m, 1 Jun 1978, *Madison et al. 4859* (SEL, MO); 7.4 km E of El Chical, 00°55′50″N, 78°07′52″W, 1,393 m, 19 Feb 2004, *Croat 94833A*; *94933A* (MO); Awá Encampment, Gualpi Chico, 00°58′N, 78°16′W, 1,330 m, 15 Jan 1988, *Hoover et al. 3232* (MO, QCA); *3238* (MO, QCA); *3253* (MO, QCA); *3254* (MO, QCA); *3257* (MO, QCA); *3258* (MO, QCA); *3259* (MO, QCA); *3260* (MO, QCA); *3262* (MO, QCA); *3264* (MO, QCA); *3266* (MO, QCA); *3268* (MO, QCA); *3270* (MO, QCA); *3278* (MO, QCA); SE trail, Gualipi Chicó, 0°58′N, 78°16′W, 1,330 m, 18 Jan 1988, *Hoover et al. 2721* (MO); 20 Jan 1988, *2866* (MO, QCA); 18 Jan 1988,. *2906* (MO); El Pailon, ca. 45 km below Maldonado 01°02′49″N, 78°22′05″W, 800 m, 29 Nov 1979, *Madison & Besse 7184* (SEL, MO); Río San Juan: Environs of Chical, 01°04′N, 78°17′W, 1,200 m, 29 May 1978, *Madison, et al. 4752* (F, SEL); Peñas Blancas, 20 km below Maldonado on the Río San Juan, 00°54′00″N, 78°11′58″W, 900–1,000 m, 27 May 1978, *4600* (SEL, MO). Espejo: Guatal, Mirador de las Golondrinas 00°49′40″N, 78°07′47″W, 1,600–1,900 m, 7 July 2003, *Clark & E. Folleco 8482* (MO, QCNE, US); Golondrinas sendero a Río El Corazón, 00°50′N, 78°08′W, 2,010 m, 24 Jan 2004, *H. Vargas, et al. 4397* (MO, QCNE). Mira: Norte del Carmen, camino a Chical, 00°51′N, 78°13′W, 2,000–2,200 m, 10 Feb 1992, *Palacios et al. 9699* (MO); Norte del Carmen, camino a Chical, 00°17′N, 78°13′W, 2,000–2,200 m, 10 Feb 1992, *9764* (MO); El Carmen, Cerro Golondrinas, 00°50′N, 78°11′W, 2,000–2,400 m, 18–25 Aug 1994, *Tirado et al. 1177* (NY, QCNE, MO); Jijon Y Camaño, unfinished road El Carmen–Chical, 00°49′N, 78°12′W, 1,700–2,300 m, 8 Jul 2003, *Clark & E. Folleco 8527* (MO, QCNE, US); Tobar Donoso, sector El Baboso, 00°53′N, 78°20′W, 1,600 m, 03 Oct 1991, *Tipaz et al. 243* (MO); Comunidad de Gualpi Medio, 01°01′N, 78°16′W, 900 m, 21 May 1992, *Quelal et al. 710* (MO, QCNE); Centro El Baboso, 00°53′N, 78°25′W,

1,800 m, 17–27 Aug 1992, *Tipaz et al. 1966* (MO); Tobar Donoso, 00°53′N, 78°25′W, 1,800 m, 17–27 Aug 1992, *Tipaz et al. 1877* (MO, QCNE).

Anthurium microspadix Schott, *Oesterr. Bot. Z.* 8(6):180. 1858. Type: COSTA RICA, near Naranjo, *Oersted sn.* (Type not found; Photo of Schott Icones #322 serves as the type). For complete synonymy see Croat (1983).

Terrestrial or epiphytic; **internodes** 1.5–4 cm long, 5–7 mm diam., pale green, weakly glossy; **cataphylls** persisting intact at upper nodes, soon weathering and deciduous except for some fibers at the base, 2–3 cm long, drying brown; **petioles** 7–9 cm long (averaging 8.2 cm), 1–3 mm diam., erect-spreading, C-shaped, weakly 3-ribbed adaxially, ca. 2/3 as long as the blades; **blades** elliptic, narrowly acuminate at apex, rounded at base, 14–19 cm long, 6.5–8 cm wide (averaging 16.7 × 7.3 cm), 2.1–2.5 times longer than broad, 2.0–2.5 times longer than the petioles, broadest at or near middle, subcoriaceous, minutely bullate; upper surface dark green and weakly glossy, lower surface moderately paler and matte; **midrib** narrowly and weakly raised in deep valleys above, round-raised and paler below; **primary lateral veins** 11–14 per side, departing midrib at ca. 45° angles, ascending to collective vein, deeply sunken above, round-raised and paler below; **tertiary veins** prominently sunken above, moderately raised below; **collective vein** arising from near the base, 5–7 mm from margin; INFLORESCENCES erect, shorter than the leaves; **spathe** reflexed-spreading, green tinged with purple, curved downward along margins; **spadix** pale green, semiglossy, ca. 5 cm long, 6 mm diam., scarcely tapered to the apex; pistils weakly emergent. INFRUCTESCENCES with immature **berries** green.

Anthurium microspadix ranges widely from Mexico (Chiapas, Jalisco, Oaxaca) to Belize (Toledo), Guatemala, Honduras, Nicaragua, Costa Rica and Panama then in South Ameria: Colombia (Antioquia, Caldas, Caqueta, Cauc, Chocó, Huila, Nariño, Putumayo, Quindio, Risaralda, Valle del Cauca), Ecuador (Azuay, Bolívar, Carchi, Cotopaxi, El Oro, Esmeraldas, Guayas, Imbabura, Loja, Los Ríos, Morona-Santiago, Napo, Pastaza, Pichincha, Sucumbios, Tungurahua, Zamora-Chinchipe), Peru (Amazonas, Cajamarca, Cusco, Huanuco, Junín, Loreto, Pasco, San Martín) and to Bolivia (Cochabamba, La Paz), to at elevations of 1,500–2,200 m, in *Tropical moist forest*, *Premontane wet forest*, *Premontane rain forest*, *Lower montane wet forest* and *Lower montane rain forest* life zones.

Anthurium microspadix belongs to sect. *Xialophyllium*. It is characterized by its elongate internodes, long-petiolate leaves, C-shaped petioles, more or less oblong, moderately bullate leaf blades which are semiglossy above and matte below, green-drying blades, more or less cylindroid green inflorescences and green berries.

Anthurium microspadix is most easily confused with *A. amoenum* in Colombia and Ecuador. That species is distinquished by having generally thicker, shorter internodes and usually larger blades with the base usually somewhat cordate at the base.

Additional specimens examined: COLOMBIA. **Nariño:** Barbacoas, Reserva Natural Río Ñambí, Corregimiento Altaquer, Vereda El Barro, margen derecha del río ñambí, 1°18′N, 78°08′W, 1,325 m, 2 Dec 1993, *Franco, P. et al. 4788* (COL, MO); Centro Cientifico, 1°05′N, 78°01′W, 1,780 m, 28 July 1988, *Croat 69636A* (MO); La Planada, 1°10′N, 77°58′W, 1,800 m, 26 Sep 1989, *Benavides 10835* (MO); 01°09′37″N, 77°59′13″W, 1,850–1,950 m, 7 Jun 1996, *Bittner 2503* (MO, PSO). ECUADOR. **Carchi:** From Goatal at 1,100 m, hike past Santa Rosa and up to El Corazon at 2,150 m, 00°48′57″N, 78°07′01″W, 2,150–2,420 m, 10 Jun 1993, *J. Bradford et al. 77* (MO); Above Maldonado, 00°54′00″N, 078°06′00″W, 2,400 m, 31 Jul 1989, *Henk van der Werff & Edgar Gudiño 10820* (MO); 9–10 mi. SE of Maldonado on road to Tulcan, 0°51′N, 78°02′W, 2,480–2,550 m, 27 Jul 1983, *Thompson & John E. Rawlins 911* (MO); 00°54′00″N, 078°06′00″W, 1,500 m, 08 Oct 1981, *L. Werling & S.*

Leth-Nissen 414 (QCA, MO. *430* (QCA, MO); ca. 10 km from Maldonado, 00°52′N, 78°06′W, 2,550 m, 05 Aug 1976, *B. Øllgaard & H. Balslev 8473* (AAU, NY); ca. 13 km SE of Maldonado, 00°49′58″N, 078°02′47″W, 2,600 m, 01 Mar 1974, *G. Harling & L. Andersson 12358* (GB, MO); *12359* (GB, MO); 23.7 km E of El Chical, 11.6 km E of Maldonado, 00°59′01″N, 078°11′37″W, 2,550 m, 10 Aug 2004, *Croat & G. Ferry 93170* (MO); Campamento Machinesca. 10 km SE of Maldonado, 00°50′23″N, 078°03′21″W, 2,200–2,400 m, 28 Feb 1974, *G. Harling & L. Andersson 12291* (GB, MO); Railroad from Ibana to San Lorenzo; km 78 Río Blanco, 00°47′00″N, 078°15′30″W, 900 m, 14 Dec 1961, *C.H. Dodson & L.B. Thien 1542* (MO, WIS); Km 60 on road to Tulcán-Maldonado, 00°51′N, 78°04′W, 2,700 m, 18 May 1973, *L.B. Holm-Nielsen et al. 5746* (AAU, S); Km 67 on road Tulcán-Maldonado, 00°53′N, 78°04′W, 2,400 m, 20 May 1973, *L.B. Holm-Nielsen et al. 6120* (AAU, S); Km 71 on road Tulcán-Maldonado, 00°54′N, 78°06′W, 2,100–2,200 m, 20 May 1973, *5984* (AAU); *5999* (AAU, S); *6024* (AAU); *6030* (AAU); El Gualtal, Cerro Golondrinas Hembra, 0°51′N, 78°08′W, 2,800 m, 21 Aug 1994, *Walter Palacios 12492* (CM, K, MO, QCNE); 7.8 mi. SE of Maldonado on road to Tulcan 00°53′N, 078°05′W, 2,400 m, 27 Jul 1983, *Thompson & John Rawlins 884* (CM, MO).

Anthurium mindense Sodiro, *Anales Univ. Centr.* Ecuador. 15(108): 17. 1901. Type: ECUADOR: Pichincha: valley of Mindo, 1,500–2,000 m, *Sodiro s.n.* (lectotype, B).

Terrestrial, hemiepiphytic, or epiphytic, erect or climbing; **internodes** 1–12 cm long, 5–18 mm diam., green, brown, or pale reddish-brown, matte; **cataphylls** to 4 cm long, drying reddish tan, bases partially persisting as largely unorganized tan fibers; **petioles** 5–12 cm long (averaging 9.9 cm), 2–3 mm diam. at middle, subterete to C-shaped, narrowly and sharply flattened near apex, less conspicuously flattened lower down, often narrowly 3-ribbed adaxially; **blades** oblong to oblong-elliptic, narrowly acuminate to caudate at apex, acute to rounded at base, 12–33 cm long, 4–12 cm wide (averaging 27.5 × 7.9 cm), 2.5–4.5 times longer than broad, 2–4.1 times longer than the petioles, broadest at or near middle, subcoriaceous to weakly coriaceous; upper surface dark green, matte, and velvety; lower surface weakly glossy and somewhat paler; **midrib** narrow, moderately acute, and slightly paler than surface above, prominently round-raised and paler or red-tinged below; **primary lateral veins** 9–14 per side, etched-sunken above, sharply to narrowly raised below, as prominent as collective vein; **interprimary veins** weakly sunken above, almost equal in prominence to primary lateral veins below; **collective vein** arising from one of first primary lateral veins, 3–5 mm from margin; INFLORESCENCES erect to spreading; **peduncle** 8–16 cm long, 1–2 mm diam.; **spathe** erect to erect-spreading, even in fruit, or reflexed, membranaceous to chartaceous, cream, pale to medium green, or yellow green, lanceolate, 3–5 cm long, 6–12 mm wide; **spadix** green becoming dark purple or greenish orange, green towards tip, matte to weakly glossy, cylindroid to weakly tapered, 4–9 cm long, 2–3 mm diam.. INFRUCTESCENCES with **fruiting spadix** 7–13 cm long, 4–11 mm diam. at base, 3–4 mm diam. at apex; **berries** orange-red, more or less rounded at apex.

Anthurium mindense ranges from Bolivia (Cochabamba), Colombia (Caqueta, Cauca, Nariño, Putumayo) to Ecuador (Azuay, Cañar, Carchi, Chimborazo, Cotopaxi, El Oro, Esmeraldas, Guayas, Imbabura, Loja, Manabí, Morona-Santiago). It ranges primarily in the Ecuadorian provinces of Pichincha and Carchi, but it is also quite common throughout the La Planada area. It occurs principally on the western slopes of the Andes at 1,200–2,500 m elevation, in *Premontane rain forest, Premontane wet forest* and *Tropical wet forest.* The species also occurs on the eastern slopes of the Andes but most of the collections from the eastern slope belong

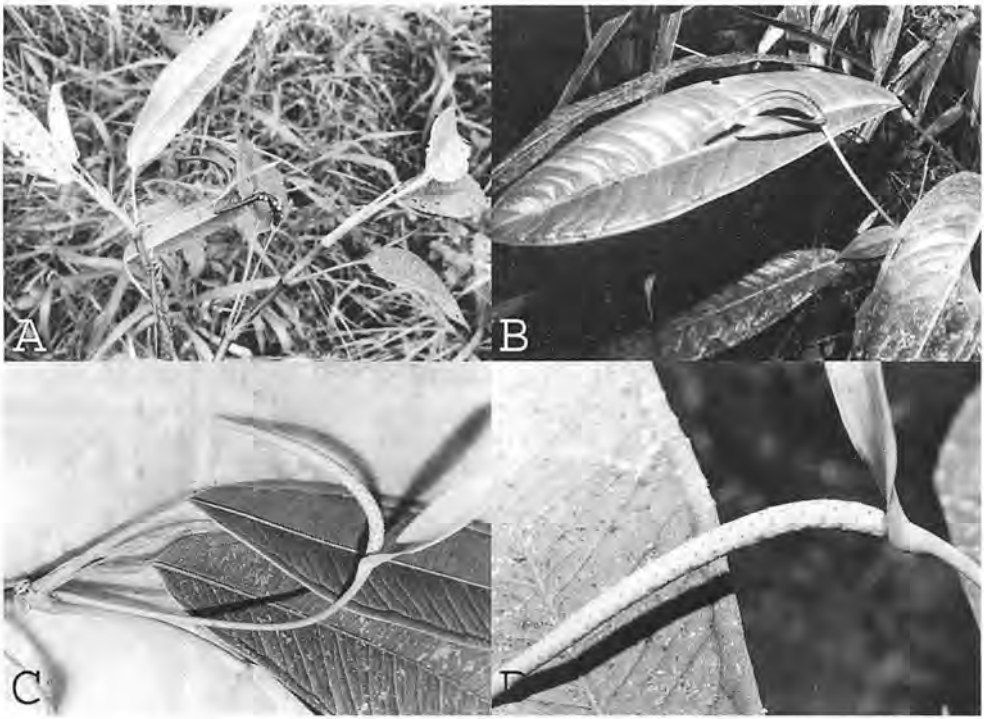

Fig. 18. a–d. *Anthurium mindense* Sodiro. a, c–d. (*Croat 69636*). a. Habit. b. Leaf blade adaxial surface. (*Croat 69576*). c. Inflorescence showing spathe and spadix. d. Detail of spadix.

to a new variety of *A. mindense* which appear to be from the same taxon.

A member of sect. *Xialophyllium*, this species can be recognized by its erect to scandent habit, long slender internodes, and more or less oblong blades with the many primary lateral veins scarcely any more prominent than the interprimary veins, as well as by the inflorescence with a green spathe and a slender dark violet-purple spadix,

This wide-ranging species is apparently quite similar to several other members of sect. *Xialophyllium*. *Anthurium stipitatum* and *A. popayanense* differ from *A. mindense* primarily in their smaller, more ovate-lanceolate blades. *Anthurium aristatum* and *A. subandinum* have much longer cataphylls which persist intact, and long, significant stipules.

The Berlin specimen lectotypified was selected because it was apparently Sodiro's first collection of this species and the only one which are annotated "*A. mindense* sp. nov."

Additional specimens examined: COLOMBIA. **Nariño:** Altaquer - Junín Rd., along road between Altaquer and Junín about km 129–130, 1,130 m, 30 Jan 1976, *Luteyn et al. 5095* (COL); Base y cima de Cerro León, 01°10′18″N, 78°00′09″W, 2,148 m, 7 Mar 1997, *G. Herrera & Bittner 9424* (MO); 01°09′55″N, 77°58′44″W, 1,850 m, 20 Jan 1997, *9151* (MO); Along trail to Pialapí to Quebrada La Calledita, 01°10′N, 77°55′W, 1,800–1,900 m, 7 Aug 1990, *Luteyn & D. Stella Sylva S. 13920* (MO); Along La Vieja Trail, open potreros, 01°10′N, 77°55′W, 1,800–1,900 m, 5 Aug 1990, *13850* (NY); 01°09′37″N, 77°59′13″W, *G. Herrera* (PSO); 01°10′N, 77°55′W, 1,800–1,900 m, 9 Aug 1990, *Luteyn & D. Stella Sylva S. 13960* (MO); 01°10′N, 77°58′W, 1,800 m, 2 Nov 1987, *Benavides 8760* (MO), *8843* (MO, PSO); 01°05′N, 78°01′W, 1,780 m, 28 Jul 1988,

Croat 69636 (MO, PSO); 01°08′N, 77°58′W, 1,750 m, 29 Nov 1981, *Gentry 35200* (COL, MO); *35045* (COL, MO); *35192* (COL, MO); 01°09′37″N, 77°59′13″W, 1,850–1,950 m, 19 Jun 1996, *Bittner et al. 2519* (MO, PSO); 01°06′00″N, 77°53′00″W, 1,800 m, 6 Nov 1994, *Joel Tupac Otero 427* (MO); 1,950 m, 13 Jan 1981, *Gentry, S. Libenson, M. Melampy, N. Hikes, M. Olson, & A. Cogollo 30587* (JUAM, MO); 1,800 m, 27 Jun 1992, *Restrepo 562* (MO); Trail from La Planada to Pielapi, 01°04′N, 78°02′W, 1,600–1,800 m, 22 Jul 1988, *Gentry, Benavides , C. Samper et al. 63621* (MO); Trail above La Posada 01°05′N, 78°01′W, 1,780 m, 26 Jul 1988, *Croat 69576* (AAU, COL, F, HUA, MO, PSO, S, UB, VEN); 01°05′N, 78°01′W, 7 Jan 1988, *Gentry, Benavides & P. Keating 60562* (MO); 01°10′N, 77°58′W, 1,800 m, 1 Nov 1987, *Benavides 8756* (MO); El Mar - La Calladita, 01°10′N, 77°58′W, 1,500–1,800 m, 29 Apr 1988, *9541* (MO); 30 Apr 1988, *9677* (PSO); 01°10′00″N, 77°55′00″W, 1,800 m, 27 Jun 1992, *Restrepo 562* (MO); 01°05′N, 78°01′W, 1,800 m, 3 Jan 1988, *Gentry & Phillip Keating 60312* (MO). ECUADOR. **Carchi:** Reserva Golondrinas, sendero entre la Estación Santa Rosa y El Corazón, 00°50′N, 78°07′W, 1,700–2,050 m, 21 Jan 2004, *Homero Vargas et al. 4224* (MO, QCNE); Mira, Norte del Carmen, camino a Chical, 00°17′N, 78°13′W, 2,000–2,200 m, 10 Feb 1992, *W. Palacios et al. 9759* (MO); El Carmen 00°50′N, 78°11′W, 2,000–2,400 m, 18–25 Aug 1994, *Milton Tirado et al. 1332* (QCNE, MO); Chical, Centro Gualpí Medio, 01°02′N, 78°16′W, 900 m, 18 Feb 1993, *Carlos Aulestia & A. Grijalva 1160* (MO, QCNE).

Anthurium nestorpazii Croat & P. Huang **sp. nov.** Type: COLOMBIA. Nariño: Corregimiento Chucunés, La Planada, borde del camino que va a Pialapí hasta Quebrada La Calladita, 03 Aug 1992, *Néstor Paz 345* (holotype, CUVC).

Internodia brevia, 3.5 cm diam.: petiolus teres, 84 cm longus, 7–11 mm diam. in siccus; lamina anguste ovato-sagittata, 72 cm longa, 45 cm lata; lobulas posterioribus 23 cm longa, 17.5 cm lata; nervis primariis lateralibus 8–9 utroque; pedunculus 21 cm longus; spatha 11 cm longa, 6 cm lata; spadix stipitata 5–7 mm, 10 cm longus, 1 cm diam.

Terrestrial; **internodes** short, 3.5 cm diam.; **petioles** terete, 84 cm long, drying 7–11 mm diam, weakly sulcate, drying light reddish brown, matte; **blades** narrowly ovate-sagittate, 72 cm long, 45 cm wide, 1.6 times longer than wide, .8 times as long as petioles, abruptly acuminate at apex, deeply lobed at base with the posterior lobes prominently turned inward and overlapping when flattened, dark green and weakly glossy above, slightly paler and semiglossy below, drying medium yellow-brown and weakly glossy on both surfaces; **anterior lobe** 52 cm long, broadly rounded on margins; **posterior lobes** 23 cm long, 17.5 cm wide; **sinus** mitered, closed, 20 cm deep, 9 cm wide; **basal veins** 9 pairs, the 1st free to the base, the remainder coalesced and more or less regularly spaced along posterior rib, the 5th and higher veins coalesced to 8 cm long; **posterior rib** to 9 cm long, prominently curved, naked along sinus 8–8.5 cm; midrib narrowly raised and slightly paler above, round-raised below, drying narrowly raised and finely ribbed above, narrowly round-raised and finely ribbed, reddish brown and matte below; **primary lateral veins** 8–9 per side, arising at 35–50° angle, bluntly acute and concolorous above, acute and slightly darker below; **collective veins** arising from one of the uppermost basal veins; tertiary veins in part drying prominulous below. INFLORESCENCES erect-spreading; **peduncle** 21 cm long; **spathe** 11 cm long, 6 cm wide, 1.8 times longer than wide, narrowly ovate, naviculiform and hooding spadix, greenish cream outside, whitish cream inside, matte and heavily veined outside, matte and minutely granular inside on drying, acute at apex, rounded at base, directed at 40° angle to the peduncle; **spadix** cylindroid-tapered, purplish violet, stipitate 5–7 mm, 10 cm long, 1 cm diam. at base, 7 mm diam. at 1 cm from apex. Flowers 8–10

visible per spiral, 2.0–2.2 mm long, 1.8–2.2 mm wide; tepals conspicuously warty, lateral tepals .8–1.0 mm wide, the outer margins 2-sided, the inner margins rounded. INFRUCTESCENCES with immature **berries** pink.

Anthurium nestorpazii is endemic to Colombia, known only from the type locality at La Planada in Nariño Dept. at 1,800 m elevation in a *Premontane wet forest* life zone. It is characterized by its short internodes, persistent fibrous cataphylls, more or less terete petioles which dry smooth, matte, the narrowly ovate-sagittate, yellowish brown-drying blades with the posterior lobes prominently directed inward and with the collective veins arising from one of the uppermost basal veins as well as by the narrowly ovate, hooding purplish violet spathe and the narrowly cylindroid-tapered, purplish spadix. It resembles *A. protrudens* and *A. benavidesae* in having the spathe prominently hooding the spadix.

The species should be compared with *A. caramantae* Engl. and *A. obtegens* Engl. as well as *A. melampyi*. *Anthurium melampyi* differs in having the spathe less enclosing the spadix and in having more than 16 pairs of primary lateral veins (versus fewer than 12 pairs for *A. nestorpazii*). *Anthurium caramantae* Engl. differs in having blades which dry yellowish green and has a dark purple-black spathe and a spadix with prominently exserted stamens. *Anthurium obtegens* differs in having the anterior lobe concave along the margins, the posterior rib less than 6 cm long, naked along sinus 2–4 cm (versus 8–8.5 cm long in *A. nestorpazii*), primary lateral veins 3–6 pairs (versus 8–9 per side for *A. nestorpazii*) as well as in having a spathe only 3 cm wide (versus to 6 cm wide for *A. nestorpazii*) spadix with exserted stamens (versus not exserted for *A. nestorpazii*).

Anthurium nigrescens Engl., *Bot. Jahrb. Syst.* 25(3): 411. 1898. Type: COLOMBIA. Antioquia: locis umbrosis declivium superiorum supra Hato-viejo, alt. 2,400 m, Sep 1884, *Lehmann n. XVIII* (B). For complete synonymy see Govaerts & Frodin (2002).

Epiphytic or hemiepiphytic vine; **internodes** elongate, 3–7 cm long, 1–2 cm diam., gray-green, smooth, weakly glossy to semiglossy; **cataphylls** to 2 cm long, chartaceous to subcoriaceous, to 13 cm long, persisting intact and drying black or deciduous, often with a few fibers remaining on upper nodes; **petioles** 27–50 cm long (averaging 39.5 cm), 3–6 mm diam. at middle, terete or obtusely flattened adaxially, medium green, unmarked, drying black; **blades** ovate-cordate to elongate triangular-ovate, acuminate at apex, cordate at base, 30–49 cm long, 18–30.3 cm wide (averaging 38.3 × 23.6 cm), 1.5–1.7 times longer than broad, .6–1.2 times longer than the petioles, broadest at or slightly below point of petiole attachment, subcoriaceous to moderately coriaceous; both surfaces semiglossy to glossy, drying black; upper surface medium to dark green; lower surface slightly paler; **anterior lobe** 25–35 cm long, 20–26 cm wide, broadest at base; **posterior lobes** 9–13 cm long, 9–13 cm wide, broadest at base, directed somewhat inward, rounded at apex; **sinus** spathulate, 7–12 cm deep; **midrib** narrowly rounded and slightly paler above, round-raised and paler below; **basal veins** 4–5 pair, the 3rd –4th coalesced (0.5) 1–6 cm; **posterior rib** curved, partly naked to not at all naked; **primary lateral veins** 7–10, departing midrib at 45°–60° angles, ascending to collective vein, narrowly raised, slightly paler, often in weak valleys above, narrowly raised and slightly paler below; **interprimary veins** weakly raised below; **tertiary veins** moderately obscure; **collective vein** arising from one of first basal veins, 4–11 mm from margin; INFLORESCENCES erect-spreading; **spathe** green, reflexed, brittle; **spadix** yellow-green; pistils weakly exserted.

Anthurium nigrescens ranges from Colombia (Antioquia, Caqueta, Cauca, Chocó, Cundinamarca, Huila, Nariño, Risaralda, Santander, Valle del Cauca), Ecuador (Azuay, Carchi, Esmeraldas, Imbabura,

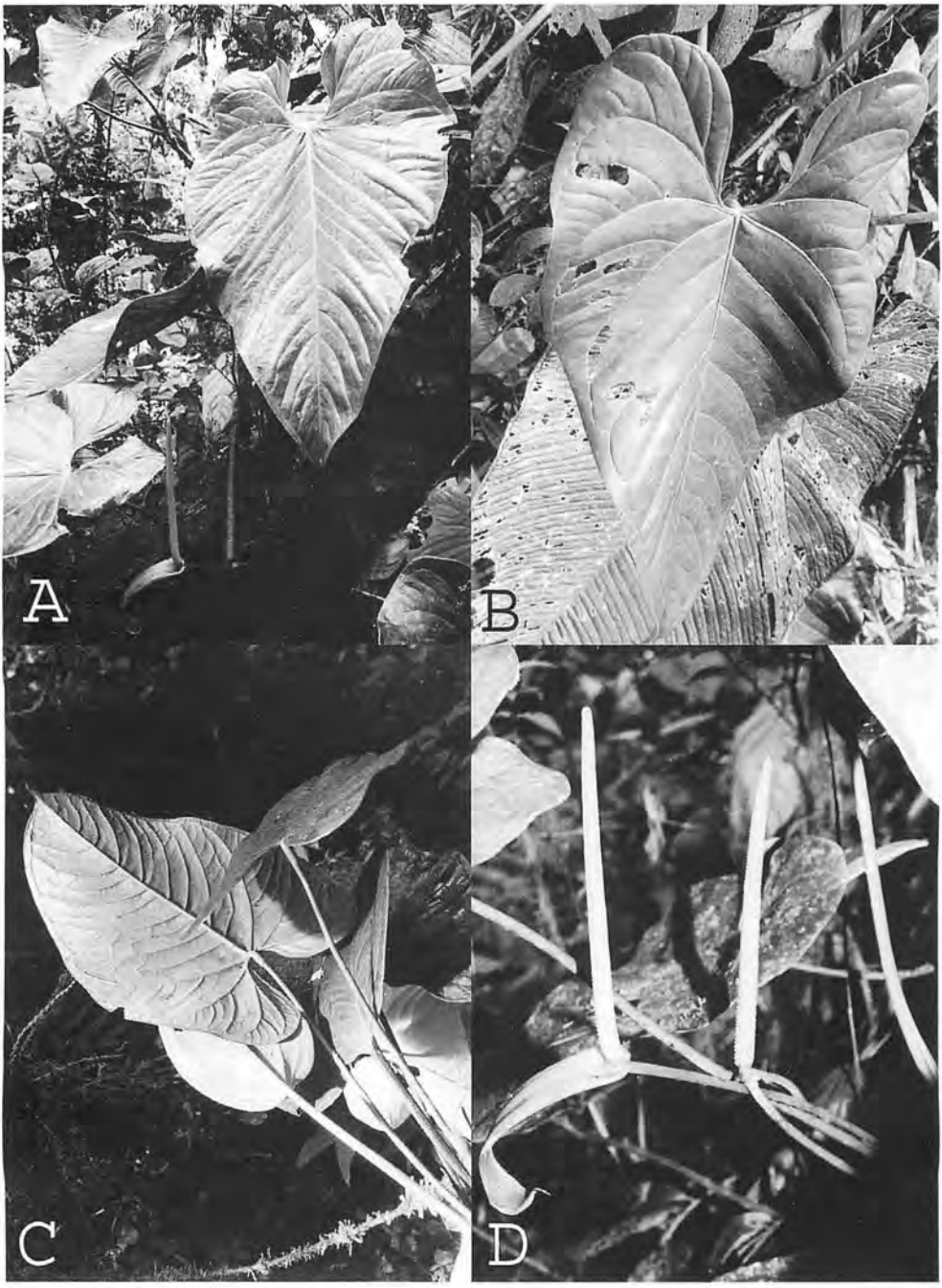

Fig. 19. a–d. *Anthurium nigrescens* Croat. a & c. (*Croat 71174*). a. Habit. b & d. (*Croat 69602*). b. Leaf blade adaxial surface. c. Petioles and leaf blade abaxial surface. d. Inflorescences showing spathe and spadix.

Loja, Los Ríos, Morona-Santiago, Pichincha, Zamora-Chinchipe), Peru (Amazonas, Cajamarca, Cusco, Huanuco, Junín, Pasco, San Martín) to Venezuela (Merida, Tachira), at elevations of 750–2,800 m (primarily above 1,700 m), in *Lower montane dry forest*, *Premontane moist forest*, *Premontane rain forest*, *Premontane wet forest* and *Tropical moist forest* life zones. It occurs throughout the upper elevations of the Western Cordillera of the Andes in Southern Colombia and much of Ecuador. At La Planada, it was collected in primary cloud forest above La Posada, along the trail to El Hondon, and along Sendero La Vieja.

Anthurium nigrescens is of uncertain sectional affinity but is currently placed in sect. *Cardiolonchium* and is recognized by its scandent habit, long internodes, and black-drying blades with prominent tertiary veins as well as by its green, reflexed spathe and yellow-green spadix.

It is most easily confused with *A. martae* owing to its vine-like habitat as well as by its elongated internodes and ovate-cordate blades but it differs from that species in having blades that dry blackened rather than greenish and are semiglossy rather than matte-subvelvety as in *A. martae*.

A noteworthy collection is *Croat 69599*, which differs from other material at La Planada in having somewhat longer blades (1.9–2.2 times longer than wide versus ca. 1.6 times longer than wide for other collections) and in having cataphylls persisting intact versus cataphylls deciduous or persisting semi-intact or as a few pale fibers at upper nodes.

Another noteworthy collection (*Croat 71701* from near Altaquer in Nariño) differs in having blades that dry more yellow-brown with finer reticulate venation and a collective vein closer to the margin and more regular. It perhaps represents another species.

Additional specimens examined: COLOMBIA. **Nariño:** La Planada along trail to Pialapí, 150–200 m past entrance to La Planada Field Station, 01°06′N, 77°53′W, 1,700 m, 10 Mar 1990, *Croat 38836* (MO, PSO); 01°09′37″N, 77°59′13″W, *G. Herrera 9526* (PSO); *9486* (PSO); Trail to El Hondón, beginning at Quebrada Tejón and for .5 km beyond, 01°08′N, 77°54′W, 780–800 m, 15 Mar 1990, *Croat 71490* (MO, PSO); 01°06′N, 77°54′W, 1,780–1,850 m, 7 Mar 1990, *Croat 71174* (COL, CUVC, HUA, MO, PSO); La Posada, 01°05′N, 78°01′W, 1,780 m, 27 July 1988, *Croat 69599* (MO, PSO); *69602* (MO, PSO); 7 km from Tumaco-Pasto road. Transect 7, 01°10′N, 77°58′W, 1,800 m, 24 July 1986, *Gentry & Benavides 55031* (MO). ECUADOR. **Carchi:** Chical, 00°56′N, 78°11′W, 1,200–1,250 m, 08 Aug 1983, *Thompson & Rawlins 997* (CM); Vic. Maldonado, 00°54′00″N, 78°06′00″W, 1,800 m, 15 Apr 1977, *M. T. Madison 3995* (QCA, SEL, MO); Chical, 00°56′N, 78°11′W, 1,200–1,250 m, 08 Aug 1983, *Thompson & John E. Rawlins 1016* (MO); Chical, 00°56′N, 78°11′W, 1,200–1,250 m, 8 Aug 1983, *1001* (CM); Tulcan, Reserva Indígena Awá, Comunidad Gualpí Alto, parroquia Chical, 01°02′N, 78°14′W, 1,800 m, 15–28 Jun 1991, *Daniel Rubio, C. Quelal & P. Nastacuaz 1613* (MO); Centro San Marcos, 01°06′N, 78°14′W, 750 m, 20–30 Apr 1993, *Patricio Méndez & M. Aulestia, José Pai 172* (MO, QCNE); *288* (MO, QCNE); Centro Gualpí Medio, 01°02′N, 78°16′W, 900 m, 18 Feb 1993, *Carlos Aulestia & A. Grijalva 1143* (MO, QCNE); Río Canumbí, 01°02′N, 78°15′W, 1,150 m, 19–28 Feb 1993, *Armando Grijalva et al. 533* (MO, QCNE).

Anthurium obtusum (Engl.) Grayum, *Phytologia* 81(1):35. 1997. Type: ECUADOR. Chimborazo: Pallatanga, *Sodiro 2* (lectotype, B).

Anthurium trinerve Miq., *Linnaea* 17:67. 1843. Type: Suriname. Palmar Awara, Forbe 120 (U). For more complete synonymy see Govaerts & Frodin (2002).

Climbing epiphyte; **internodes** less than 1 cm long, to 5 mm wide, brownish gray upon drying; **cataphylls** to 2 cm long, drying brown, persisting as a fine reticulum of fibers, especially on upper nodes; **petioles** D-shaped, broadly and sharply sulcate adaxially, 5–10 mm long (averaging 8 mm), 1–2 mm diam., sulcate; geniculum

3–5 mm long; **blades** ovate-elliptic, apiculate at apex, acute to rounded at base, 3–7 cm long, 1.5–4 cm wide (averaging 5.9 × 3.1 cm), 1.8–2.3 times longer than broad, 2.8–3.5 times longer than the petioles, broadest at or near the center, subcoriaceous; upper surface semiglossy to matte, lower surface matte, both surfaces dark glandular-punctate; **midrib** acutely raised above, narrowly rounded below; **primary lateral veins** many and scarcely more prominent than interprimary veins; **collective veins** arising from base, 2–3 mm from margin; INFLORESCENCES erect-spreading, shorter than the leaves; **peduncle** 1–2 cm long, 1–2 mm diam.; **spathe** erect, lanceolate, brown on drying, to ca. 2 cm long, 1 cm wide; **spadix** greenish white to pinkish, 1.5–2.5 cm long, tapered from 4 mm diam. at base to 2 mm diam. at apex. INFRUCTESCENCES 4–7 cm long, 1–1.5 cm diam.; **berries** white or sometimes pale lavender, globose, 5–7 mm diam.; seeds 4–10 per berry, oblong.

Anthurium obtusum is a widely distributed species. It ranges from the Caribbean area (Dominican Republic) and Central America (Belize, Costa Rica, Panama), to Colombia (Amazonas, Antioquia, Caldas, Caqueta, Chocó, Cundinamarca, Guainia, Huila, Meta, Nariño, Putumayo, Valle del Cauca), Ecuador (Azuay, Carchi, El Oro, Esmeraldas, Guayas, Los Ríos, Manabí, Morona-Santiago, Napo, Orellana, Pastaza, Pichincha, Sucumbios, Zamora-Chinchipe), Peru (Amazonas, Cusco, Huanuco, Loreto, Madre de Dios, Pasco, San Martín, Tumbes) and Bolivia (Cochabamba, La Paz) in the western Andes as well as to Venezuela (Amazonas, Apure, Bolivar, Delta Amacuro, Zulia), French Guiana, Guyana, Suriname and Brazil (Acre, Amazonas, Roraima) in eastern South America. It occurs at elevations of 100–1,850 m, primarily under 900 m, in *Premontane moist forest*, *Tropical dry forest*, *Tropical moist forest*, *Premontane wet forest*, *Tropical wet forest* and *Premontane rain forest* life zones.

Anthurium obtusum belongs to sect. *Tetraspermium*, and it is distinguished by its internodes longer than broad, persistent cataphyll fibers, short-petiolate leaves, sulcate petioles, ovate-elliptic blades that are dark glandular-punctate on the lower surface as well as by the short-pedunculate inflorescence with a erect spathe and pinkish spadix.

Anthurium obtusum is most easily confused with *A. scandens* var. but that taxon differs in having smaller blades and reflexed rather than erect spathe.

The collections from La Planada differ substantially from other collections of *A. obtusum* from lower elevations by having more elliptic to ovate-elliptic blades. Generally those from lower elevations have oblong-elliptic blades.

Additional specimens examined: COLOMBIA. **Nariño:** Recaurte, Benavides Finca, Km 63 on Tumaco-Tuquerres Road, 50 m, 25 Nov 1981, *Gentry 34916* (COL, MO); Tumaco, Corregimiento de Llorente, vereda El Carmen, Finca Campoalegre, 50 m, 11 Aug 1977, *Díaz, S. et al. 1102* (COL). ECUADOR. **Carchi:** Tulcan, Reserva Etnica Awá, Comunidad de Gualpí Medio, 01°01'N, 78°16'W, 900 m, 21 May 1992, *Carlos Quelal, Galo Tipaz & J. Taicúz 744* (MO).

Anthurium ovatifolium Engler, *Bot. Jahrb. Syst.* 25:437–8. 1898. Type: ECUADOR. Cotopaxi: Corazon, Aug. 1873, *Sodiro 38* (holotype, B; isotype, Q). For complete synonymy see Croat (1999).

Epiphytic or sometimes terrestrial; **internodes** short, 2.7–5 cm diam.; **cataphylls** subcoriaceous, to 25 cm long, persisting semi-intact as a thick reticulum of fibers, drying tan or reddish brown; **petioles** (35–) 48–72 cm long (averaging 60 cm), 4–6 mm diam., U-shaped, sharply V-sulcate adaxially; **blades** ovate to broadly ovate, obtuse and rounded at apex, rounded at base, 29–53 cm long, 14–40 cm wide (averaging 49 × 29 cm), 1.2–2.1 times longer than broad, .6–.9 times as long as the petioles, broadest between middle and base, moderately coriaceous, glossy and moderately bicolorous; **midrib** narrow, convex and slightly paler above, narrowly

Fig. 20. a. *Anthurium obtusum* (Engl.) Grayum. (*Croat 49690*). a. Habit. b. *Anthurium ovatifolium*, (*Croat 69568*). b. Leaf blade, adaxial surface and inflorescence. c–d. *Anthurium pendulispadix* Croat. (*Croat 69613*). c. Stem showing cataphylls and base of petioles. d. Leaves, adaxial surface and spadix on right.

rounded below; **basal veins** 3–7 pairs, largely free to base 2 reaching to apex, 1–5 terminating at margin, varying widely in distance from margin; **primary lateral veins** ca. 20–30 per side, departing midrib at ca. 45° angles, quilted-sunken above, pleated-raised below; INFLORESCENCES erect; **peduncle** 45–60 cm long, 5–7 mm diam.; **spathe** reflexed, chartaceous, light green, sometimes tinged purplish on the back and margin, drying dark brown, 14–16 cm long, 2.5–3.5 cm wide, oblong; **spadix** pale yellow-green to greenish yellow, greenish toward tip or brown, sessile or weakly stipitate, cylindroid or weakly tapered, erect, 12–20 cm long, 8–12 mm diam. at base, 8–10 mm diam. at apex; pollen white. INFRUCTESCENCES with **fruiting spadix** cylindroid or weakly tapered, (20–) 24–30 cm long, 24–32 cm diam. at base, 22–28 cm diam. at apex; pistils early emergent; **berries** early emergent, green, becoming bright red, acute at apex.

Anthurium ovatifolium ranges from Colombia (Antioquia, Nariño, Valle del Cauca) to Ecuador (Azuay, Bolívar, Cañar, Carchi, Chimborazo, Cotopaxi, El Oro, Esmeraldas, Imbabura, Loja, Morona-Santiago, Napo, Pastaza, Pichincha, Tungurahua, Zamora-Chinchipe) to Peru (Amazonas, Cajamarca, San Martín), at elevations of 300–2,300 m, primarily above 1,500 m, in *Premontane moist forest*, *Tropical moist forest*, *Premontane wet forest*, *Premontane rain forest* and, *Montane wet forest* and *Montane rain forest* life zones. It occurs throughout much of the Western Cordillera of the Andes at higher elevations. At La Planada, it was found in primary and secondary forest, along the trail to La Vieja and along the trail above La Posada.

A member of sect. *Digittinervium*, this species is moderately common. It is easily

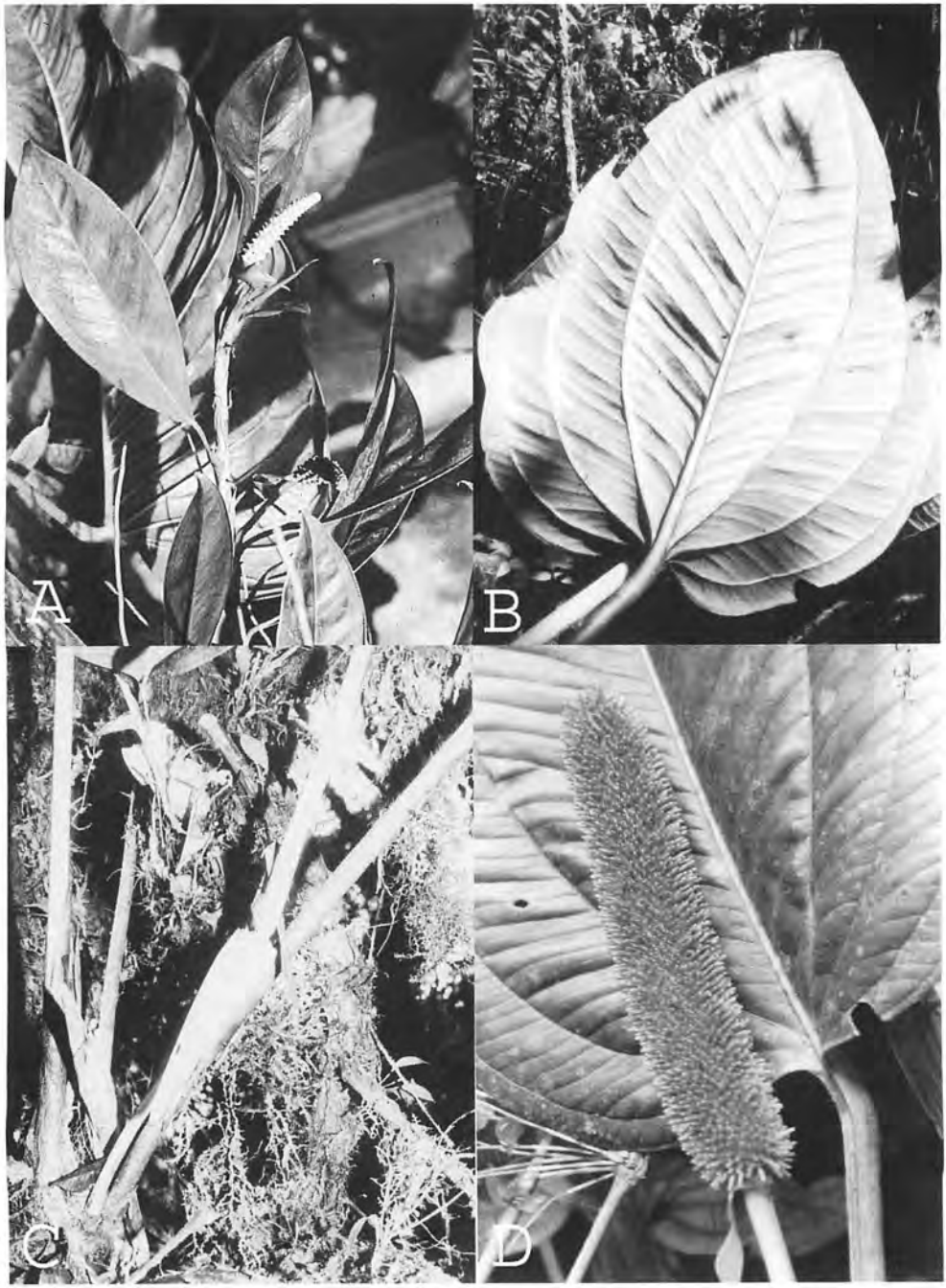

Fig. 21. a. *Anthurium obtusum* (Engl.) Grayum. (*Madison et al., SELBY 78-2218*). a. Inflorescence. b–d. *Anthurium ovatifolium* Engl. (*Croat 69568*). b. Leaf blade abaxial surface. c. Stem showing cataphylls and base of petioles. d. Inflorescence showing infructescence.

distinguishable by its coriaceous blades with several pairs of basal veins which extend at least part of the way to the apex, the scalariform primary lateral veins, the dark glandular punctations on the lower blade surface and the early emergent red berries.

The species is not confused with any other species at La Planada and is distinguished from members of sect. *Porphyrochitonium* which also have glandular punctations on at least the lower surface by the much larger leaf blades and the regular scalariform veins which extend between the basal veins.

Elsewhere *A. ovatifolium* might be confused with *A. lingua* Sodiro but that species has blades which are typically narrowly ovate, not elliptic and dry light yellow-green instead of blackened.

Additional specimens examined: COLOMBIA. **Nariño:** Ricaurte, Reserva La Planada, Quebradas, El Mar - La Calladita, 01°10′N, 77°58′W, 1,500–1,800 m, 30 Apr 1988, *Benavides 9664* (MO); 01°08′N, 77°58′W, 1,750 m, 26 Nov 1981, *Gentry 35044* (COL, MO); 01°09′37″N, 77°59′13″W, 1,850–2,000 m, 21 Jun 1996, *Bittner et al., 2592* (MO, PSO); 01°06′00″N, 77°53′00″W, 1,950 m, 13 Jan 1981, *Gentry et al. 30536* (MO); 01°09′37″N, 77°59′13″W, *Jens Bittner 2626* (PSO); 01°09′37″N, 77°59′13″W, *G. Herrera 9386* (PSO); 01°09′37″N, 77°59′13″W, *G. Herrera 9536* (PSO); 1,800 m, 29 Sep 1992, *Restrepo & G. Ramírez 611* (MO); *Benavides 55078* (MO); La Posada, 01°05′N, 78°01′W, 1,780 m, 26 Jul 1988, *Croat 69568* (CM, CUVC, IBE, KRAM L, LE, MO, PSO, QCA, RSA, S, TEX, U, UB, WWL, Z); 01°10′N, 77°58′W, 1,800 m, 1 Nov 1987, *Benavides 8692* (MO); 01°10′00″N, 77°55′00″W, 1,800 m, 29 Sep 1992, *Restrepo & G. Ramírez 611* (MO); 01°10′N, 77°58′W, 1,800 m, 24 July 1986, *Gentry et al. 55078* (MO); 01°05′N, 78°01′W, 1,900–2,100 m, 23 Dec 1987, *Gentry & P. Keating 59745* (MO). ECUADOR. **Carchi:** Río San Juan Valley, Ortiz Ranch between Peñas Blancas and El Pailón, N-facing slope below ridge crest above Río San Juan, 00°49′N, 78°09′W, 1,230–1,250 m, 10 Jun 1993, *B. Boyle et al. 2030* (MO); ca. 6 km above Maldonado, just below Puente de Palo on steep slope and ridge crest above road, 00°54′N, 78°06′W, 2,275 m, 23 May 1993, *B. Boyle & J. Bradford 1928* (MO); Awá Indigenous Territory, Community of Gualpí Alto, 01°01′N, 78°18′W, 825 m, 18 Dec 1995, *Alonso Ortiz et al. 792* (MO); 9–10 mi. SE of Maldonado on road to Tulcan 00°51′N, 78°02′W, 2,480–2,550 m, 27 Jul 1983, *Thompson & J. E. Rawlins 908* (MO); Awá Reserve: Community of Baboso, 00°55′N, 78°25′W, 990 m, 6 Jul 1995, *Ortiz, A. et al. 541* (MO); Chical, 12 km below Maldonado on the Río San Juan, 01°04′N, 78°17′W, 1,200 m, 28 May 1978, *M. T. Madison et al. 4695* (SEL); El Pailon: ca. 45 km below Maldonado along a foot path to Tobar Donoso, 01°02′49″N, 78°22′05″W, 800 m, 27 Nov 1979, *M. T. Madison & L. Besse 7073* (US, SEL, MO); 00°54′00″N, 78°06′00″W, 1,500–1,900 m, 15 Apr 1977, *M. T. Madison 3963* (SEL, MO); Espejo, El Gualtal, Faldas de Cerro Golondrina Hembra, 00°51′N, 78°07′W, 2,450 m, 21 Aug 1994, *W. Palacios 12612* (MO, NY, QCNE, SEL); 00°53′N, 78°25′W, 1,800 m, 17–27 Aug 1992, *Galo Tipaz et al. 1986* (MO).

Anthurium pazii Croat **sp. nov.** Type: COLOMBIA. Nariño: Municipio Ricaurte, Coregimiento de Chucunés, Vertiente Occidental, La Planada, borde del camino a Pialapi, hasta Quebrada la Calladita, 1,800 m, 3 Aug. 1992, *Néstor Paz 329* (holotype, MO-6058103; isotype, PSO).

Internodia brevia, 4–5 mm longa, 3–4 mm diam.; cataphylla 2–2.5 cm longa, persistens in fibris; petiolus 18–23 cm longus; lamina anguste ovato-elliptica vel anguste oblongo-elliptica, 12–13.7 cm longa, 3.8–4.6 cm lata; nervis primariis lateralibus 4–5 utroque; spatha viridis, 2.5 cm longa, 2.5 mm lata; spadix viridis, sessilis, 13.3 cm longus, 2 mm diam. in siccus; bacca violacea-purpurea.

Epiphyte on branches high in canopy; **stems** with the older sections **internodes** 4–5 mm long but flowering portion very

Fig. 22. a. *Anthurium pazii* Croat. (*Paz 329*). a. Herbarium specimen. b–d. *Anthurium pendulispadix* Croat. b. Stem showing cataphylls and base of petioles. (*Croat 71612*). c–d. (*Croat 69613*). c. Infructescence. d. Detail of infructescence.

short, 3–4 mm diam., **cataphylls** 2–2.5 cm long, persisting as reddish brown fibers with some fragments of epidermis; **petioles** 18–23 cm long (averaging 20 cm), weakly sulcate with a weak medial rib, drying 2–3 mm diam., light to dark brown, matte; **blades** narrowly ovate-elliptic to narrowly oblong-elliptic, 12–13.7 cm long, 3.8–4.6 cm wide (averaging 13 × 4.2 cm), 4.6 times longer than wide, .6–.7 times as long as petioles, broadest at middle or slightly below the middle, gradually acuminate at apex, acute to weakly attenuate at base, dark green and matte above, paler and matte below, drying dark gray-brown and matte above, paler yellow-brown and matte below, upper surface eglandular, drying minutely granular on magnification; lower surface densely dark glandular-punctate; **midrib** narrowly and sometimes acutely raised, weakly paler above, somewhat acute and concolorous below, lacking glandular punctations; **primary lateral veins** 4–5 pairs, arising at 55–60° angle; **collective veins** arising from the base, 4–5 mm from the margin, equal to the primary lateral veins, both the collective veins and the primary lateral veins drying concolorous, thin and weakly undulated on both sufaces. INFLORESCENCES erect; **peduncle** 23.5 cm long, drying 2 mm wide, yellow-brown; **spathe** 2.5 cm long, 2.5 mm wide, green, spreading, folded down along the margins, ending abruptly and short-apiculate at apex, acute and joining peduncle at 45° angle; **spadix** sessile, greenish, 13.3 cm long, drying 2 mm wide; 66 times longer than wide, tapered to an almost needle-like tip on drying. Flowers 2–3 visible per spiral, drying ca. 4 mm long, 1.2–1.5 mm wide; tepals 2–2.4 mm wide, the outer margin 2-sided, meeting at a broad angle, inner margin nearly straight; stamens emerging just above the tepals; anthers .4 mm long, .6 mm wide, thecae broadly divaricate; pistils .6 × .4 mm diam. INFRUCTESCENCES to 20 cm long, **berries** violet-purple.

Anthurium pazii is known only from the type locality at La Planada at 1,800 m in *Premontane wet forest* life zone.

This species is a member of sect. *Porphyrochitonium* and is characterized by its small stature, slender internodes, slender weakly sulcate petioles, the brownish-drying narrow leaf blades with a narrowly raised upper midrib and with the undulating dried primary lateral veins and collective veins but especially by the very slender needle-like spadix and violet-purple berries.

The species is closest to *Anthurium pedunculare* Sodiro a species of sect. *Porphyrochitonium* with a long-tapered spadix but that species differs in having the upper blade surfaces glandular-punctate and conspicuously areolate with usually a brown spot in the areolae and glandular-punctate on the lower surface with brownish, irregular markings on the blade surfaces. Although also glandular-punctate on the upper surface, *A. pazii* has much more conspicuous glandular punctations on the upper surface, lacks the conspicuously areolate upper surface and has a much darker dried lower surface with pale, subcircular markings. In addition the flowers of *A. pedunculare* are much broader and have the inner margin of the lateral tepals rounded (versus with the flowers very narrow with the inner margin straight).

The species is named in honor of botanist Nestor Paz, formerly from the Universidad del Valle who collected many interesting and new species from La Planada.

Anthurium pendulispadix Croat **sp. nov.** Type: COLOMBIA. Nariño: La Planada, 7 km above Chucunés, on road between Tuquerres and Ricaurte, flat swampy plain S of Sendero Natural, *Croat 69613* (holotype, MO-3636035–8, MO-4319428, MO-4369443; isotypes, AAU, B, CAS, COL, CUVC, F, G, GB, GH, HUA, JAUM, K, M, MEXU, NY, P, PSO, QCA, QCNE, S, SEL, TEX, UB, US, VEN).

Internodia 6–12 cm longa, 6–9 mm diam; cataphylla persistentia in fibris, 27 cm longa; petiolus 13–30 cm longus, acute C-formatus, sulcatus, pluricostatus;

lamina elliptica vel anguste ovata, 16–35 cm longa, (5–) 10–14.5 (–18) lata; nervis primariis lateralibus 5–9 utroque; spatha viridis, suffusa rosea et purpurea, 8–18 cm longa, 5–9 cm lata; spadix 22–36 (–42) cm longus, 2–4 mm diam., baccae albae.

Terrestrial or epiphytic, often scandent; **internodes** 6–12 cm long, 6–9 mm diam., medium green, turning brown; **cataphylls** subcoriaceous, to ca. 27 cm long, drying tan, persisting semi-intact at upper nodes, as a coarse, loose reticulum lower on plants, fibers drying light reddish brown; **petioles** 13–30 cm long (averaging 22 cm), 3–5 mm diam., sharply C-shaped, sulcate; geniculum 1.5–2 cm long, drying darker than petiole; **blades** more or less elliptic to narrowly ovate, apiculate to narrowly acuminate at apex, rounded at base, 16–35 cm long, (5–) 10–14.5 (–18) cm wide (averaging 29 × 12 cm), 1.8–2.8 (–4) times, longer than broad, (0.5–) 1–1.7 (–2) times longer than the petioles, broadest at or slightly below middle, coriaceous; upper surface dark green and velvety; lower surface slightly paler, semiglossy, both surfaces glandular punctate; **midrib** acute and paler above, convex and much paler below; **primary lateral veins** 5–9 pairs, arising at 45–50° angle etched above, weakly raised below; **interprimary veins** weak; **collective veins** 2 pairs, arising from near base, narrowly sunken above, convex and darker than surface below, first 4–6 mm from margin, the second 18–23 mm from margin; INFLORESCENCES erect; **peduncle** 20–35 (–45) cm long, 3–5 mm diam., purplish; **spathe** reflexed-recurled, subcoriaceous, green tinged purple, light green or maroon, lanceolate, 8–18 cm long, 5–9 cm wide; **spadix** yellowish green, maroonish, grayish, or white, sessile, more or less cylindroid, 22–36 (–42) cm long, 2–4 mm diam.; tepals brownish yellow, pistils greenish, turning gray-green, with white emergent pistils, finally purple. Flowers 2–3 per primary spiral, 3.1–3.5 mm long, 1.5–2.0 mm wide; INFRUCTESCENCES with **fruiting spadix** to ca. 40 cm long, to ca. 1 cm diam.; **berries** white, depressed globose, 4 mm diam., 3.5 mm high, depressed medially at apex.

Anthurium pendulispadix is known in Colombia (Nariño) and Ecuador (Carchi, Esmeraldas), primarily from 1,200 to 1,800 m elevations (3 specimens from Esmeraldas at elevations below 900 m), in *Premontane wet forest* life zone.

Anthurium pendulispadix is a member of sect. *Porphyrochitonium*. This pecies is abundant in the swampy area to the south of the Sendero Natural, frequent in the open area along the trail behind the Centro Cientifico, and is apparent occasionally in the primary forest as well. It is recognized by its long internodes, semi-intact, clasping cataphyll fibers, long-petiolate, more or less elliptic blades which are dark green and velvety above with dark glandular-punctations on the lower surface, by its depressed-globose white berries and its slender long, usually pendent yellowish green spadix (hence the name *A. pendulispadix*).

This species could be confused with a similar species: *A. pachyphyllum*, but that species differs from this species in having somewhat larger blades, much wider spathes, and spadices of a much greater diam.

Paratypes: COLOMBIA. **Nariño:** Barbacoas, 2 km N of Junín on road to Barbacoas, in woods along road, 01°21′N, 78°10′W, 1,200 m, 18 Nov 1986, *B. Hammel & R. Bernal 15760* (CM, COL, MO, PSO); Reserva Natural Río Ñambí, Corregimiento Altaquer, Vereda El Barro, 01°18′N, 78°08′W, 1,325 m, 4 Dec 1993, *Franco, P. et al. 4847* (MO); *4869* (COL); *5149* (COL), 01°10′N, 77°58′W, 1,800 m, 1 Nov 1987, *Benavides 8733* (PSO, COL, K); Along trail to Pialapi beyond Quebrada La Calledita, 01°08′05″N, 77°58′57″W, 1,800–1,900 m, 8 Aug 1990, *Luteyn & Sylva 13938* (NY), 01°08′05″N, 77°58′57″W, 1,800–1,900 m, 9 Aug 1990, *13956* (NY); 01°09′37″N, 77°59′13″W, *Bittner 2651* (PSO); 01°05′N, 78°01′W, 1,850 m, 28 July 1988, *Croat 69669* (MO, PSO); 01°08′N, 77°58′W, 1,750 m, 26 Nov 1981, *Gentry 35048* (MO); Borde Hermógenes, 01°10′00″N, 77°55′00″W, 1,800 m, 18 Nov 1993, *Restrepo 772* (MO); 1,800 m, 18 Nov 1993, *772* (MO; 20 Nov 1993, *801* (MO); Pielapi, 01°04′N, 78°02′W, 1,600–1,800 m, 22 Jul

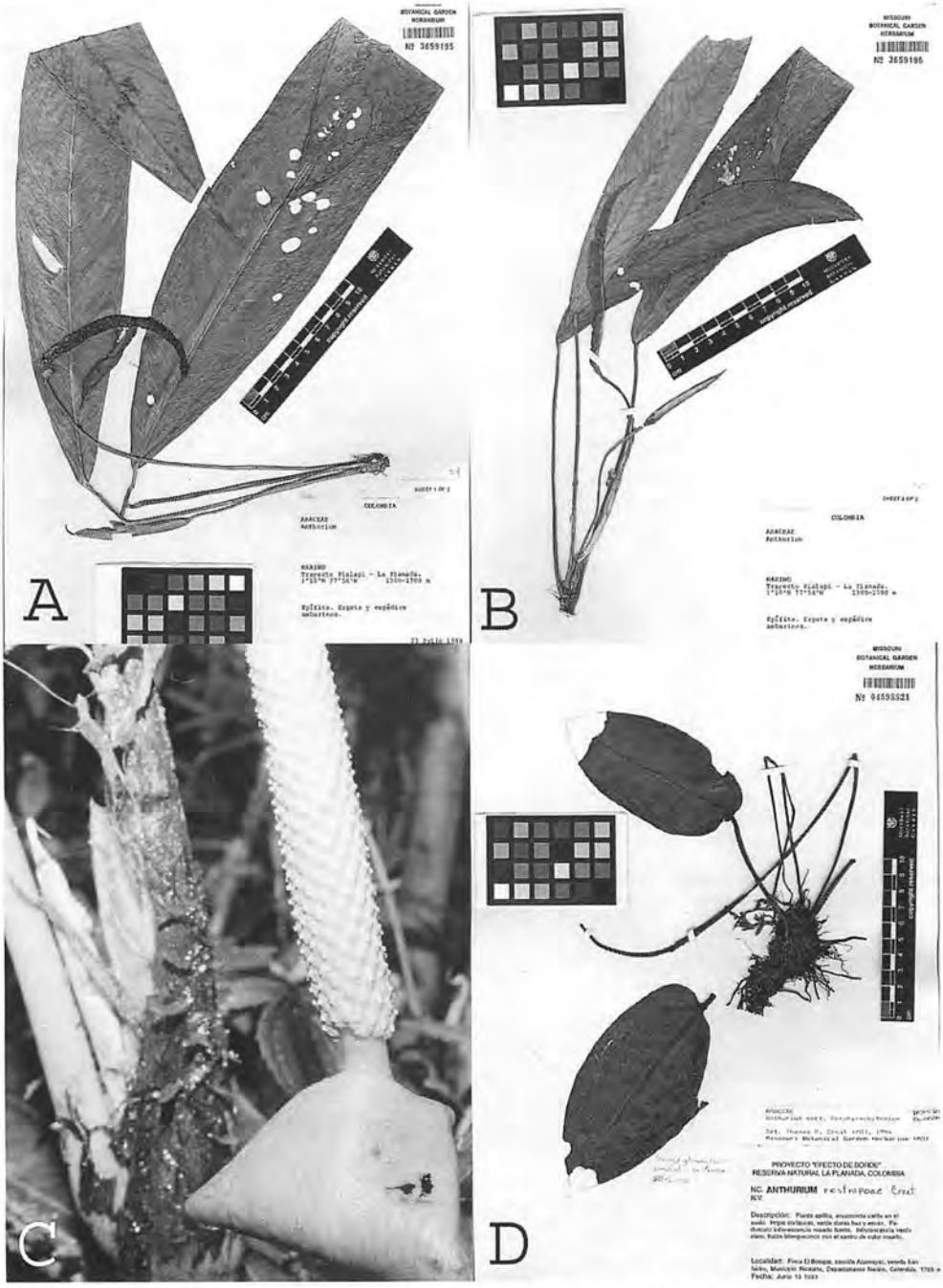

Fig. 23. a–b. *Anthurium subcarinatum* Engl. (*Benavides 10148*). a. Herbarium specimen. b. Herbarium specimen. c. *Anthurium pulverulentum* Sodiro (*Croat 69569*). c. Inflorescence showing spathe and spadix. d. *Anthurium restrepoae* Croat. (*Restrepo 639*). d. Herbarium specimen.

1988, *Gentry et al. 63659* (MO); 01°05′N, 78°01′W, 1,780 m, 26 Jul 1988, *Croat 69583* (MO, PSO); 01°10′N, 77°58′W, 1,800 m, 15 Nov 1987, *Benavides 8920* (MO); 1 Nov 1987, *8733* (COL, K, MO); 01°10′00″N, 77°55′00″W, 1,800 m, 20 Nov 1993, *Restrepo 801* (MO); 01°10′N, 77°58′W, 1,800 m, 25 Jul 1986, *Gentry et al. 55139* (MO); *Gentry, 55140* (MO); Trail to El Hondón, 5–12 km SW of La Planada, 01°04′N, 78°02′W, 1,750–1,800 m, 6 Jan 1988, *Gentry et al. 60507* (MO); 01°08′07″N, 77°58′57″W, 1,800 m, 14 Apr 1992, *Giraldo 110* (HUA); Río Ñambí, 7 km W of Altaquer, 01°18′N, 78°04′W, 1,100–1,130 m, 20 Mar 1990, *Croat 71612* (MO, PSO). ECUADOR. **Carchi:** Tulcan, Reserva Indigena Awá, Parroquia Tobar Donoso, Central El Baboso, 00°53′N, 78°25′W, 1,800 m, 17–27 Aug 1992, *Tipaz et al. 1963* (MO); 00°53′N, 78°25′W, 1,800 m, 17–27 Aug 1992, *1985* (MO, QCNE). **Esmeraldas**, Lita-San Lorenzo Road, 5.5 km W of Alto Tambo, 685 m, 00°57′04″N, 78°33′29″W, 17 Oct 1999, *Croat 83433* (MO, QCNE); 11 km W of El Durango, 9.7 km W of Alto Tambo, 01°02′31″N, 78°37′03″W, 8 Jul, 1998, *Croat 82558* (MO, QCNE).

Anthurium planadense Croat **sp. nov.** Type: COLOMBIA. Nariño: La Planada, 7 km above Chucunés, on road between Tuquerres and Ricaurte, along Sendero La Vieja, along ridge top in direction of La Pina, 1°06′N 77°54′W, 1,950–2,010 m, 9 Mar 1990, *Croat 71213* (holotype, MO-3827493–5; isotypes, B, COL, CUVC, GB, K, NY, PSO, S, US).

Internodia brevia, 1–3 cm longa, 2–3 cm diam.; cataphylla persistentia in fibris, ad 10 cm longus; petiolus 70–80 cm longus, 4–6 mm diam., teres; lamina ovato-cordata, 49–57 cm longa, 24–26 cm lata; nervis primariis lateralibus 15–25 utroque; spatha viridis suffusa marronina, 7–9 cm longa, 2.0–2.7 cm lata; spadix cylindraceus, marroninus, 7–9 cm longus, 5–7 mm latus.

Terrestrial; **juvenile** with **petiole** 20–30 cm long, 1–2 mm diam.; **blade** ovate-triangular to cordate, 15–20 cm long, 7–10 cm wide; **adult** with **stems** to ca. 60 cm long; **internodes** short (1–3 cm long), 2–3 cm diam., drying reddish brown; **cataphylls** to 10 cm long, persisting as coarse reticulum of fibers with a few longitudinal fragments of epidermis at upper nodes, longitudinally somewhat organized below, fibers reddish brown fresh, drying tan; **petioles** 70–80 cm long (averaging 76 cm), 4–6 mm diam., terete, sometimes obscurely and narrowly sulcate adaxially, almost matte, asperous, weakly striate; geniculum swollen, tinged purple, 2–3 cm long; **blades** ovate-cordate, acuminate at apex, cordate at base, 49–57 cm long, 24–26 cm wide (averaging 53 × 25 cm), 2–2.2 times longer than broad, .7–.75 times longer than the petioles, broadest at or near point of petiole attachment, subcoriaceous, dark green and matte above, moderately paler and semiglossy below, drying dark brown above, reddish brown; **anterior lobe** 34–38 cm long, the lateral margins almost straight; **posterior lobes** 15–19 cm long, 9.5–11.5 cm wide, directed inward and the lobes sometimes overlapping on dried specimens; **sinus** obovate, 14–18 cm deep, 5 cm wide; **midrib** acutely raised and purplish above, round-raised and paler below; **basal veins** 8–9 pair, the 1st (–2nd) pair free to the base, the remainder variously coalesced 9–11 cm, acutely raised below; **posterior rib** naked 6–10 cm, broadly curved; **primary lateral veins** 15–25 per side, departing midrib at ca. 60° angle, ascending to collective vein, deeply quilted-sunken above, prominently raised below; **collective vein** arising from near base, as prominent as primary lateral veins, 1–2 mm from margin; INFLORESCENCES erect-spreading; **peduncle** 22–27 cm long, 2–5 mm diam., drying reddish-brown; **spathe** lanceolate, 7–9 cm long, 2.0–2.7 cm wide, green, tinged maroon weakly within and on veins outside, hooding spadix, lanceolate, acuminate at apex; **spadix** maroon, cylindroid, matte, 7–9 cm long, 5–7 mm diam. Flowers 10–12 on the primary spiral, 2.0–2.3 mm long, 1.7–2.0 mm wide, pistils

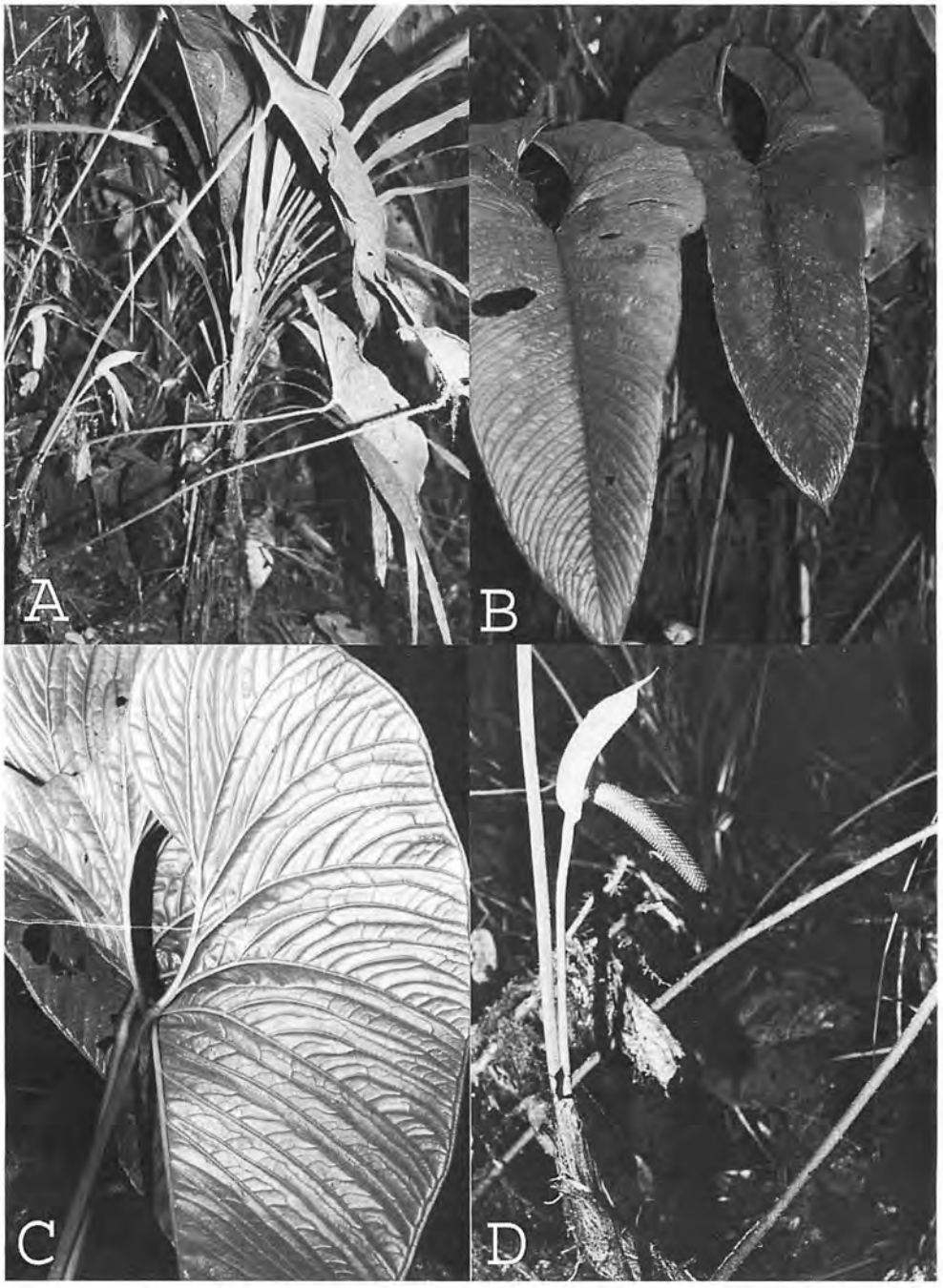

Fig. 24. a–d. *Anthurium planadense* Croat. (*Croat 71213*). a. Habit. b. Leaf blade, adaxial surface. c. Leaf blade, abaxial surface showing venation. d. Inflorescence showing spathe and spadix.

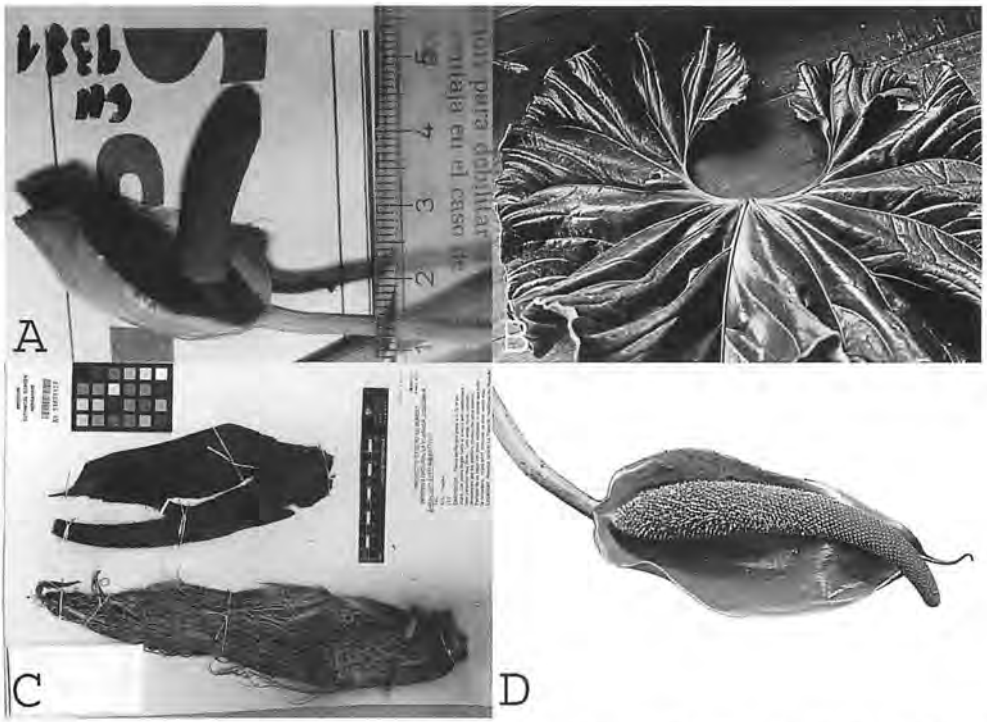

Fig. 25. a. *Anthurium planadense* Croat. (*Herrera & Bittner 9381*). a. Detail of inflorescence. b–d. *Anthurium protrudens* Croat. (*Restrepo 786*). b. Leaf blade, adaxial surface. c. Herbarium specimen showing cataphylls and inflorescence. d. Inflorescence showing spathe and spadix.

whitish, emergent; stamens exserted; pollen white.

Anthurium planadense is apparently endemic to the type locality in La Planada (hence the name *A. planadense*), Colombia (Nariño), where it is moderately rare. It was seen only along Sendero Vieja, and along ridge top in direction of La Pina at elevations up to 2,010 m, in *Premontane wet forest* life zone.

A member of sect. *Belolonchium*, this species can easily be recognized by its strictly terrestrial habit, closely spaced primary lateral veins, its short, narrow peduncle, its pendent, stubby, maroon, cylindroid spadix, and hooding spathe.

Although this species looks somewhat similar to several other members of sect. *Belolonchium*, it differs from each in several important ways. *Anthurium tremulum* has a much long peduncle, a more rounded sinus, and a narrower blade. *Anthurium tungarahue* differs in having a much more rounded sinus and narrower blades. *Anthurium vulcanicum* shares a similar blade, but has a much larger inflorescence and longer peduncle.

Paratype: COLOMBIA. **Nariño:** Ricaurte, La Planada, entre cerro inciensal y la hondonada a Cerro León, 01°10′18″N, 78°00′09″W, 1,850 m, 13 Feb 1997, *G. Herrera & Bittner 9381* (MO, PSO).

Anthurium protrudens Croat **sp. nov.** Type: COLOMBIA. Nariño: La Planda, Salazar Finca 7 km above Ricaurte, premontane wet forest, 01°08′N, 77°58′W, 1,750 m, 29 Nov 1981, *A. Gentry 35190* (holotype, MO-6065898–900902; isotype, COL).

Internodia brevia, 5 cm diam.; cataphylla ad 32 cm longa, persistens in fibras brunneus; petiolus ultra 1 m longus, ca. 2 cm latus, subteres, lentiter sulcatus; lamina ovato-sagittata, 110–115 cm longa, 73–74 cm lata; nervis lateralis primariis 8–9 utroque; nervis basalis 11 (–12) utroque; spatha erecta, 30 cm longa, 10.5 cm lata, ruber; spadix 30.5 cm longus, 1.3 cm diam. ad basim, 3 cm diam. ad medium in siccus, ruber.

Epiphyte; **internodes** short, 5 cm diam.; **cataphylls** to 32 cm long, light brownish fiberious, persisting in dense mass; **petioles** more than 1 m long, ca. 2 cm diam., subterete, weakly sulcate and medium yellow-brown and matte on drying; **blades** ovate-sagittate, 110–115 cm long, 73–74 cm wide, margins, sinuate in lower 1/3, the tissue unable to be flattened without folding; upper surface drying minutely wrinkled and glossy at higher magnification; lower surface drying minutely granular; **anterior lobe** 77–80 cm long, 71–75 cm wide (averaging 78 × 73 cm), 1.1 times longer than broad, broadly rounded and somewhat sinuate along the margin; **posterior lobes** 31–36 cm long, 20–21.5 cm wide, prominently incurled and overlapping; **sinus** closed, rounded at apex, 21–26 cm deep, 16–18.5 cm wide; **midrib** acute and paler above, narrowly rounded and paler below, drying acute above with fine ribs along the sides above; anterior lobe 85 cm long, broadly convex along the margins, prominently lobed at base; **primary lateral veins** 8–9 pairs, arising at 45–50° angle, drying acute and almost concolorous above, narrowly rounded and darker below; **collective veins** arising from one of the primary lateral veins in the upper 1/3 of blade, 3–6 mm from margin; **tertiary veins** moderately obscure; **basal veins** 11 (–12) pair, 1st pair free to the base, the remainder regularly branching off the posterior rib, 4 of them ascending and merging with the margin above the petiole insertion, the remainder lowermost basal veins curved upward and merging with the margin below the petiole insertion; **posterior rib** 17–17.5 cm long, markedly curved, naked 13–14 cm; INFLORESCENCES erect; **peduncle** short, to 9 cm long,[1] 11 mm diam., drying matte, light brown; **spathe** erect, 30 cm long, 10.5 cm wide, 2.8 times longer than broad, bright red, drying matte, dark brown outside, medium reddish gray-brown inside, narrowly acuminate at apex the acumen tightly inrolled; inner surface with ca. 9 veins; **spadix** 30.5 cm long, narrowly rounded and 1.3 cm diam. at base, 3 cm diam. midway when dried, 1 cm diam. at 1 cm from tip, bright red. Flowers 21–25 visible per spiral, 2.6–3.0 mm long, 2–2.3 mm wide, drying medium dark brown, matte and sparcely thick-granular; lateral tepals 2.6–2.8 mm wide, outer margins 2-sided, inner margin almost straight; stamens 2.0–2.2 mm long, 1 mm wide, held erect just above the tepals in a dense cluster, thecae not at all divericate; pollen pale yellow

Anthurium protrudens is known only from the type locality at La Planada in Nariño Dept. at 1,750 m, in a *Premontane wet forest* life zone.

This species is a member of sect. *Belolonchium*, and is characterized by its short internodes, persistent reddish brown cataphyll fibers, its subterete petioles, large ovate-sagittate, brown-drying blades with the broadly curving naked posterior ribs and up to 12 basal veins, all but one of them coalesced into the posterior rib. It is especially characterized by its bright red spathe and spadix and it large protruding stamens (hence the name *A. protrudens*).

It can easily be confused with *A. benavidesae* which also occurs at La Planada. That species has similarly shaped large brown-drying blades but differs by having the collective veins originating from the one of the lowermost basal veins, in having a greenish cream spathe and a pink spadix. In contrast *A. protrudens* has the collective veins arising from one of the upper primary lateral veins and a bright red spathe and spadix.

[1] Note: The only inflorescence was mounted with three additional pieces of what could be petiole or peduncle and the field notes makes no mention of the length of the peduncle so it could be short or it could be up to 1 m long.

Paratype: COLOMBIA. **Nariño:** La Planada, borde Hermogenes, 01°10′00″N, 77°55′00″W, 1,800 m, 18 Nov 1993, *Restrepo & A. Ortega 786* (MO).

Anthurium pulverulentum Sodiro, *in Anales Univ. Centr.* Ecuador. 15(108): 11. 1901. Type: ECUADOR. Pichincha: Volcan Atacatzo along the Río Pilaton, 1,400–2,000 m, *Sodiro s.n.* (holotype, QPLS; isotype, G).

Anthurium adsimile Sodiro, *Anturios Ecuator.* 219. 1903. Type: Ecuador. Guayas: Río Rircay, *Rimbach 75* (QPLS).

Hemiepiphytic to epiphytic; **internodes** 1.5–10 cm long, 1–3 cm diam., pale yellow-green, weakly glossy, becoming brown, sometimes weakly fissured transversely; **cataphylls** over 30 cm long, drying reddish brown, mushy and often semi-intact at upper nodes, often persisting as pale tan fibers at lower nodes; **petioles** 45–94 cm long (averaging 74 cm), 4–7 mm diam., terete, several ribbed adaxially, more or less brittle, medium green, matte, narrowly flattened to narrowly sulcate and sometimes bluntly to sharply many-striate circumferentially; geniculum to ca. 2 cm long; **blades** ovate-cordate, acuminate at apex, 57–81 cm long, 33–54 cm wide (averaging 65 × 36 cm), 1.5–2.0 times longer than broad, .7–1.4 times longer than the petioles, broadest below point of petiole attachment, thinly coriaceous, margin convex; surfaces somewhat to conspicuously bicolorous; upper surface dark green and velvety; lower surface matte; **anterior lobe** 46–63 cm long, 36–54 cm wide; **posterior lobes** 15–22 cm long, 13–24 cm wide, directed inward, rounded; **sinus** spathulate, 12–18 cm deep; **midrib** acute and slightly paler above, round-raised and paler below; **basal veins** 7–8, coalesced; **posterior rib** partially naked; **primary lateral veins** 25–30, closely spaced, departing midrib at 60°–75° angles, ascending to the collective vein, deeply sunken and somewhat quilted above, narrowly pleated-raised and slightly paler below; **tertiary veins** in part sunken above and raised below; **collective vein** arising from last or next to last basal vein, 2–4 mm from margin; INFLORESCENCES erect; **peduncle** 19–25 cm long, 2–5 mm diam.; **spathe** reflexed to recurled, subcoriaceous, green, lanceolate, 22–30 cm long, 1.55–2.0 cm wide, broadest at base, acuminate at apex; **spadix** bluish green at anthesis, stipitate, slightly to moderately tapered, 26–28 cm long, 4–7 mm diam. at base, 3–4 mm diam. at apex, broadest at base. INFRUCTESCENCES with **berries** yellow-green.

Anthurium pulverulentum ranges from Colombia (Cauca, Chocó, Nariño, Valle del Cauca), Ecuador (Cañar, Carchi, Cotopaxi, El Oro, Esmeraldas, Guayas, Imbabura, Los Ríos, Manabí, Napo, Pichincha), at elevations of 350–2,300 m (primarily from elevations above 1,400 m, but a few collections, especially those from Esmeraldas, are from elevations lower than 800 m), in *Premontane moist forest*, *Premontane wet forest* and *Premontane rain forest* life zones. It is apparently common at La Planada, with specimens collected in both primary and secondary regrowth forests, as well as along the margins of an old pasture along Sendero La Vieja.

This species is a member of sect. *Polyneurium*, and it is recognized by its internodes longer than broad and weakly and finely transverse-ridged, its large, moderately thin, velvety leaf blades with many, closely spaced, deeply sunken primary lateral veins as well as by the inflorescence with a long, slender green spathe and its narrowly long-tapered bluish green spadix.

Anthurium pulverulentum can be confused with *A. subcoerulescens*, which differs primarily in having basal lobes directed prominently outward, and in having a narrower anterior lobe. The latter does not occur at La Planada.

Additional specimens examined: COLOMBIA. **Nariño**, Pasto-Tumaco Road-Río Ñambí, along along trail, departing main road at Escuela Mixta El Mirador, 7 km W of Altaquer, 01°18′N, 78°04′W, 1,100 m, 26 Feb 1992, *Croat 72410* (MO, PSO); Valley of Río Guiza, road from El Espino to Tumaco, ca. 21 km W of Ricaurte,

Fig. 26. a–d. *Anthurium pulverulentum* Sodiro. (*Croat 69569*). a. Habit. b. Leaf blade, adaxial surface. c. Stem showing cataphylls and base of petioles. d. Inflorescence showing spathe and spadix in early fruit.

on steep slopes along small stream, 01°15′N, 78°07′W, 1,000 m, *B. Hammel 17146* (MO); Barbacoas, Junín-Barbacoas, along along road between Junín and Barbacoas, 1.9 km NE of Junín, 01°21′N, 78°06′W, 1,130 m, 27 Feb 1992, *Croat 72426* (G, MO, PSO); Ricaurte. Río Imbi Valley, Pasto-Tumaco, Vicinity of "Palmar", in valley of Río Imbi, 3 km NW of Ricaurte (along road between Pasto and Tumaco), ca. 1 km E of Texas Gulf Pipeline Maintenance Station, along slopes above Río Imbi, 01°08′N, 77°56′W, 1,100 m, 14 Mar 1990, *Croat 71410* (MO, PSO); 01°09′37″N, 77°59′13″W, 1,850–1,950 m, 19 June 1996, *Bittner et al. 2522* (MO, PSO); 01°09′40″N, 77°58′78″W, 1,850–2,050 m, 8 June 1996, *2491* (MO, PSO); 01°10′N, 77°58′W, 1,800 m, 24 July 1986, *Gentry & Benavides 55017* (MO); 17 Jan 1990, *Benavides 11224* (PSO); 01°09′37″N, 77°59′13″W, *Bittner 2727* (PSO); 01°09′37″N, 77°59′13″W, *G. Herrera 9647* (PSO); Transect 1, 01°08′N, 77°58′W, 1,750 m, 28 Nov 1981, *Gentry 35098* (COL, MO); *Gentry 35109* (COL, MO); 1,300 m, 4 Apr. 1941, 1,300 m, *Kjell von Sneidern .452* (HA); 01°18′N, 77°54′W, 800–1,100 m, 5 Jan 1996, *Ramírez, B.R. et al. 9381* (PSO); 1,800 m, 12 Nov 1993, *Restrepo 672A* (MO); La Posada 01°05′N, 78°01′W, 1,780 m, 26 Jul 1988, *Croat 69569* (MO, PSO); 01°06′N, 77°54′W, 1,780–1,850 m, 7 Mar 1990, *Croat 71176* (AAU, CAS, COL, CUVC, F, GB, HUA, K, M, MO, NY, PMA, PSO, QCA, QCNE, SEL, UB, US, VEN, WU); 01°10′00″N, 77°55′00″W, 1,800 m, 12 Nov 1993, *Restrepo 672* (MO); Borde Hermógenes, 01°10′00″N, 77°55′00″W, 1,800 m, 18 Nov 1993, *Restrepo 774* (MO); 16 Jan 1993, *Restrepo 633* (MO); 01°05′N, 78°01′W, 7 Jan 1988, *Gentry et al. 60557* (MO); Río Ñambí: Altaquer–Tumaco, 01°18′N, 78°04′W, 1,100–1,130 m, 20 Mar 1990, *Croat 71630* (MO, PSO). ECUADOR. **Carchi**: Vicinity of Maldonado, 00°54′00″N, 78°06′00″W, 1,500–1,900 m, 15 Apr 1977, *M. T. Madison 3919* (QCA, SEL, MO); Río San Juan Valley, 4 hr walk below Chical, at Ortiz ranch between Peñas Blancas and El Pailón, 00°49′N, 78°09′W, 1,230–1,250 m, 10 June 1993, *B. Boyle et al. 2117* (MO); Between Chical and Peña Blanca, trailside and forest edge, valley of Río San Juan on Colombia border, 1,100–1,250 m, 24 Sep 1979, *Gentry & Gene Schupp 26471* (MO, SEL); Cerro Golondrinas, N-facing slope on S side of upper Río Blanco valley, 00°52′N, 78°11′W, 1,750–1,800 m, 23 Mar 1993, *B. Boyle et al. 1572* (MO); Upper Río Pablo drainage, along crest of ridge to N of river, 00°53′N, 78°10′W, 1,740–1,780 m, 24 Apr–02 May 1993, *B. Boyle & L. Dalmau 1747* (MO, F); Maldonado: Parroquia Tobar Donoso, Reserva Etnica Awá, Sabalera, 00°55′N, 78°32′W, 900 m, 22 Nov 1992, *Carlos Aulestia et al. 729* (MO); N side of Río Mira, across from Lita, steep N-facing slope directly across from Baboso, on S side of Río Baboso, 00°53′N, 78°27′W, 750 m, 11 Aug 1994, *B. Boyle & A. Boyle 3522* (MO); Quebrada Penas Blancas - Quebrada Quinchul, 00°58′N, 78°12′W, 10 Aug. 1983, *Thompson & Rawlins 1037* (CM, MO); 2.6 km from Tandayapa, 00°00′09″N, 78°39′47″W, 1,772 m, 14 Feb 2005, *Croat et al. 94658* (MO); on trail from Quebrada Peñas Blancas to Quebrada Quinchul, 00°58′N, 78°12′W, 10 Aug 1983, *Thompson & J. E. Rawlins 1037* (MO); El Pailon, ca. 45 km below Maldonado along a foot path to Tobar Donoso, 01°02′49″N, 78°22′05″W, 800 m, 01 Dec 1979, *M. T. Madison & L. Besse 7231* (SEL, MO); Peñas Blancas, 20 km below Maldonado on the Río San Juan, 01°00′42″N, 78°14′49″W, 900–1,000 m, 27 May 1978, *M. T. Madison et al. 4602* (SEL, MO). Espejo, Parroquia, Guatal. Mirador de las Golondrinas, trail from Santa Rosa (El Rosal) towards Las Juntas, 00°49′N, 78°07′W, 1,600–1,900 m, 7 Jul 2003, *Clark, J.L. & Folleco, E. 8484* (MO, QCNE, US), Mira, N of Carmen, road to Chical, 00°51′N, 78°13′W, 2,000–2,200 m, 10 Feb 1992, *W. Palacios et al. 9744* (B, MO, QCNE); Tulcan, Tobar Donoso, Sector Sabalera, Reserva Indígena Awá, Noreste Casa Comunal, 01°00′N, 78°24′W, 650–1,000 m, 19–28 June 1992, *Galo Tipaz et al. 1549* (MO, QCNE); Comunidad El Baboso, 8 km al norte de Lita, 00°50′N, 78°20′W, 800 m, 15 Oct 1991, *Daniel Rubio et al. 2163* (MO, QCNE); Comunidad de Gualpí Medio,

01°01'N, 78°16'W, 900 m, 21 May 1992, *Carlos Quelal et al. 607* (MO, QCNE); Centro El Baboso, 00°53'N, 78°25'W, 1,800 m, 17–27 Aug 1992, *Tipaz et al. 1987* (MO, QCNE); *1981* (MO).

Anthurium restrepoae Croat **sp. nov.** Type: COLOMBIA. Nariño: Reserva Natural La Planada, Finca El Bosque, Sección Acantayac, Vereda San Isidro, Municipio Ricaurte, 1,700 m, June 13, 1993, *C. Restrepo 639* (holotype, MO-04598821; isotype, PSO).

Internodia brevia, ca. 1 cm diam.; cataphylla 3 cm longa, persistens in fibras pallida; petiolus 5.5–7.5 cm longus, subteres; lamina ovato-elliptica, 11.5–15 cm longa, 6.1–7.2 cm lata, rotundata vel debiliter subcordata ad basim; nervis lateralibus 5–7 utroque; spadix roseus, 12.5 cm longus, 2 mm diam. ad basim in siccus, 3 mm diam. ad medium, 1 mm ad 1 cm ab apicem.

Epiphyte; **internodes** short, ca. 1 cm diam.; **cataphylls** 3 cm long, narrowly long-tapered, soon persisting as closely parallel pale fibers with fragments of epidermis; **petioles** 5.5–7.5 cm long (averaging 6.5 cm), subterete, obtusely sulcate adaxially, drying matte; geniculum 1 cm long, drying slightly shrunken and blackened; **blades** ovate-elliptic, shortly acuminate at apex, inequilateral, rounded to weakly subcordate at base, 11.5–15 cm long, 6.1–7.2 cm wide (averaging 13 × 6.6 cm), 1.9–2.1 times longer than broad, 2 times longer than the petioles, moderately coriaceous, densely and minutely papillate and with conspicuous warty raised areas and many fine granulations, eglandular above, densely and minutely dark glandular-punctate below; **midrib** narrowly rounded above, becoming acute toward the apex; **primary lateral veins** 5–7 pairs, arising at an acute angle then spreading at 60–70° angle, primary lateral veins scarcely distinquishable from the interprimary veins; **collective veins** 1–2 per side, arising at the base, the inner pair 6–10 mm from the margins, loop-connecting primary lateral veins, scarcely more prominent than the interprimary lateral veins and minor veins; all veins weakly raised upon drying. INFLORESCENCES erect; held well above the leaves; **peduncle** 22 cm long, 2 mm diam., drying yellow-brown, weakly glossy; **spathe** not seen; **spadix** sessile, strongly pinkish, narrowly long-tapered, 12.5 cm long, drying 2 mm diam. at base, 3 mm diam. midway, 1 mm diam. at 1 cm from apex. Flowers 2–3 visible per spiral, 2.8–3 mm long, 1.4–1.5 mm wide; lateral tepals 1.9–2.1 mm wide, outer margin obtusely 2–sided, inner margin broadly rounded; stamens held at apex of tepals, persisting on all 4 sides of the pistil but not contiguous; stamens .4 mm long, .6–.8 mm wide; thecae ovoid, broadly rounded, markedly divaricate. INFRUCTESCENCES with **berries** white, the old stigmas pink.

Anthurium restrepoae is endemic to Colombia, known only from the type locality in Nariño Dept. at La Planada at 1,700 m in *Premontane wet forest* life zone.

It is a member of sect. *Porphyrochitonium* and is characterized by its epiphytic habit, short internodes, narrowly tapered, persistent cataphylls, the petioles shorter than the blades, narrowly ovate-elliptic brown-drying blades glandular-punctate on the lower surface and with the primary lateral veins inconspicuous but especially by the long-pedunculate inflorescence with long, sharply tapered pink inflorescences and light green infructescence with whitish berries.

Anthurium restrepoae is similar to *A. chucunesense* but that species differs in having longer petioles (9–11 cm long), shorter, narrower blades which are equilateral and acute at the base, lacks a second pair of basal veins and has a green, weakly stipitate spadix as well as violet berries.

The species is named in honor of Carla Restrepo a biologist working in Puerto Rico who carried out investigations at La Planada where she discovered the type specimen of this species.

Anthurium ricaurtense Croat **sp. nov.** Type: COLOMBIA. Nariño: La Planada, 7 km above Chucunés, on road between Tuquerres and Ricaurte,

along Sendero Vieja, along ridge top in direction of La Pina, 1°06'N, 77°45'W, 1,950–2,010 m, 9 Mar 1990, *Croat 71216* (holotype, MO-3827490–2; isotypes, B, COL, CUVC, HUA, K, M, NY, PSO, QCNE, US).

Internodia usque 6 cm longa, 4 cm diam.; cataphylla persistens intacta, ad 20 cm longa; petiolus (45–) 55–90 (–107) cm longus, 7–12 mm diam., teres, obscure et anguste sulcata basim versus; lamina ovato-cordata, (34.5–) 44–75 cm longa, 24–52 lata; glanduloso-punctata infra; nervis primariis lateralibus 12–16 utroque; spatha (9.5–) 16–18 cm longa, 2–5.5 cm lata, lutea-viridis; spadix albus, 9.5–15 cm longus, 9 mm diam. ad basim, 7 mm diam. ad apicem; baccae virella.

Terrestrial, loosely climbing epiphyte, or epiphyte; **stem** to 2 m long; **internodes** to 6 cm long, 4 cm diam., dark reddish brown; **cataphylls** persisting intact, red-brown except when young, to ca. 20 cm long; **petioles** (45–) 55–90 (–107) cm long (averaging 70.3 cm), 7–12 mm diam., terete, obscurely and narrowly sulcate toward base, medium green, semiglossy; **blades** ovate-cordate, acuminate at apex, cordate at base, (34.5–) 44–75 cm long, 24–52 cm wide (averaging 57 × 37 cm), 1.5–1.6 times longer than broad, .6–1.1 times longer than the petioles, subcoriaceous to moderately coriaceous; **anterior lobe** 28–54 cm long, 24–50 cm wide; upper surface dark green and semiglossy to moderately glossy, drying dark yellowish brown; lower surface slightly paler and glossy, obscurely glandular-punctate, drying dark reddish brown; **posterior lobe** 8–22 cm long, 11–23 cm wide, directed slightly inward; **sinus** spathulate, 7–19 cm deep; **midrib** narrowly rounded to bluntly acute and paler above, paler and acutely 3-ribbed to about middle below, acutely 1-ribbed to acutely angled toward apex; **basal veins** 6–8 pair, 3–4 free to base, the remainder coalesced for 1–5 cm; **posterior rib** largely naked; **primary lateral veins** 12–16 per side, narrowly raised, paler, and in valleys above, convex to acute and paler below; **tertiary veins** in part raised or flat and somewhat darker than surface below; **collective vein** arising from second or third basal vein, 1–3 mm from margin; INFLORESCENCES erect, about as long as leaves, **peduncle** 60–100 cm long, ca. 1 cm diam. at middle, terete, drying yellowish brown; **spathe** lanceolate, narrowly long-acuminate, (9.5–) 16–18 cm long, 2–5.5 cm wide coriaceous, yellow-green, tinged with purple inside, becoming reflexed in fruit, ca. 18 cm long, drying red-brown; **spadix** white, sessile, 9.5–15 cm long, 9 mm diam. at base, gradually tapering to 7 mm diam. at apex. Flowers 14–17 visible on primary spiral, 1.4–1.7 mm long, 1.2–1.4 mm wide. INFRUCTESCENCES with **fruiting spadix** 31 cm long, to 4 cm diam., medium green; pistils green; **berries** greenish, early emergent.

Anthurium ricaurtense is known only from Colombia (Nariño) and Ecuador (Carchi, Esmeraldas), at elevations of 1,100–2,100 m, in *Premontane wet* forest and *Premontane rain forest* life zones. Now it is also found at in Ecuador (Esmeraldas), at elevations of ca. 200 m in *Tropical wet forest*. At La Planada it was seen only in primary cloud forest above La Posada and along Sendero Vieja on the trail to La Piña.

This species is a member of sect. *Calomystrium* recognized by its elongate stems, thick, reddish brown, intact, persistent cataphylls, terete petioles and long-pedunculate inflorescences with large coriaceous green spathes and thick white spadices.

Anthurium ricaurtense is similar to *A. formosum*, but differs in having petioles much less conspicuously marked with lenticels and in having secondary and tertiary veins not prominently sunken. Furthermore, the posterior rib of *A. formosum* is not naked for as great a length as that of *A. ricaurtense*. *Anthurium ricaurtense* might also be confused with *A. nymphaeifolium*, but that species differs in having the collective vein originating from the uppermost basal vein or even a primary lateral vein, and running only along the upper half of the anterior lobe.

A noteworthy collection is *Tipaz et al., 1300* from Ecuador, Carchi Province which

Fig. 27. a–d. *Anthurium ricaurtense* Croat. a–c. (*Croat 71216*). a. Habit. b. Leaf blade, adaxial surface. c. Stem showing cataphylls and base of petioles. d. Inflorescence showing spathe and spadix. (*Croat 69610*).

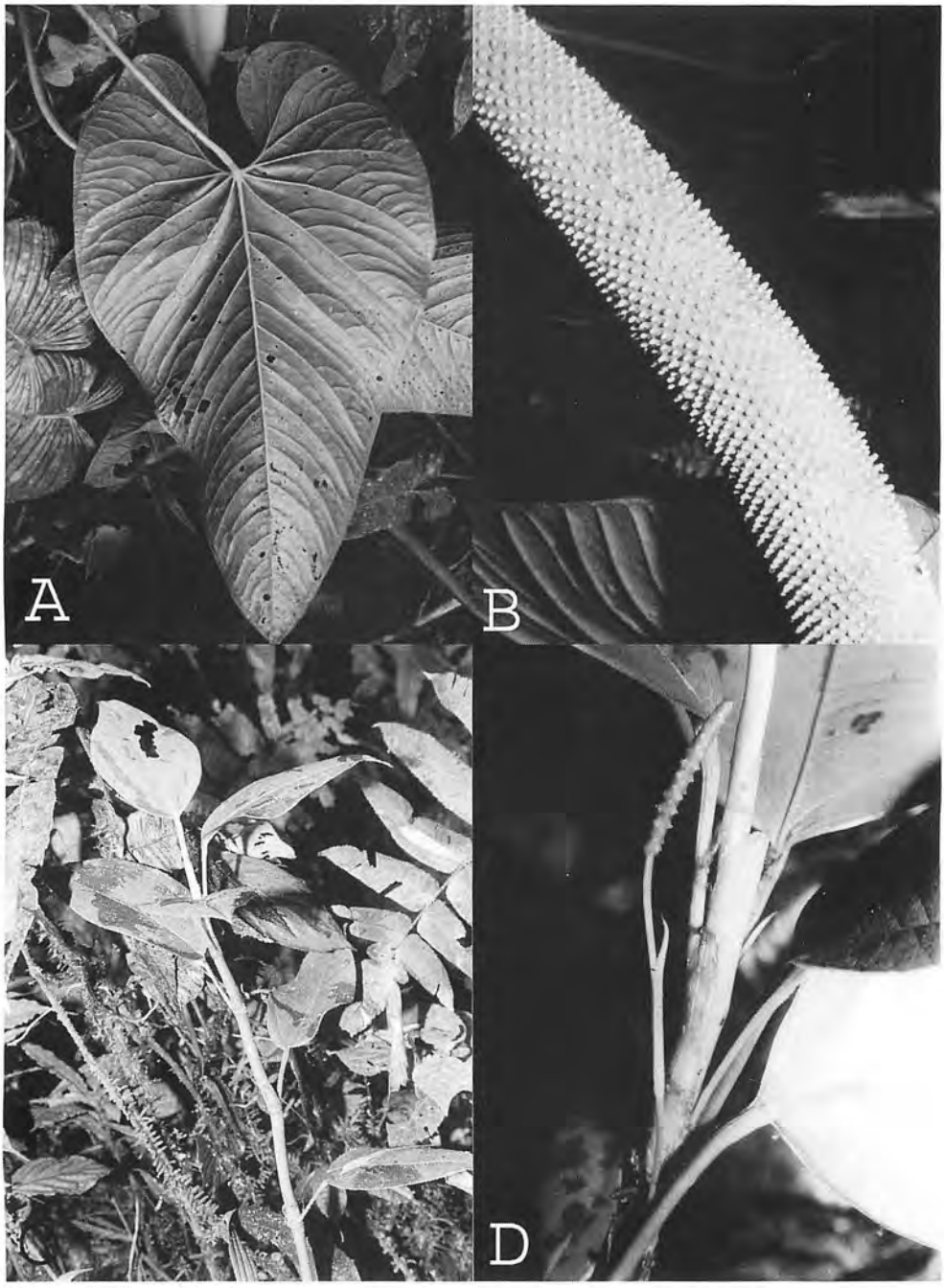

Fig. 28. a–b. *Anthurium ricaurtense* Croat. (*Croat 71216*). a. Leaf blade, abaxial surface. b. Detail of spadix. c–d. *Anthurium terracolum* Croat. (*Croat 69585*). c. Habit. d. Stem with inflorescence showing spathe and spadix.

has a peduncle only 5 cm long and blades 45 cm long with petioles 50 cm long. In all aspects these measurements are smaller than others seen and it is not certain whether this plant should be included. Yet other collections from nearby regions, namely Centro El Baboso in the Awá Reserve, have vegetative parts of normal size for the species.

The name *Anthurium ricaurtense* was derived from the nearby town of Ricaurte and the Municipio Ricaurte in which La Planada is located.

Paratypes: COLOMBIA. **Nariño:** Barbacoas, Reserva Natural Río Ñambí: Corregimiento Altaquer, Vereda El Barro, vic. Cabaña Fund, 01°18′N, 78°08′W, 1,325 m, 11 Dec 1993, *J. Betancur et al. 4864* (MO); Ricaurte, La Planada Reserve, Cerro León, 01°10′18″N, 78°00′09″W, 1,850 m, 13 Feb 1997, *G. Herrera & Bittner 9401* (MO, PSO); Cerro León, 01°10′18″N, 78°00′09″W, 2,148 m, *G. Herrera C. & Bittner 9449* (MO); La Posada, 01°05′N, 78°01′W, 1,780 m, 27 Jul 1988, *Croat 69610* (MO, PSO); Borde Marcos, 01°10′00″N, 77°55′00″W, 1,800 m, 15 Nov 1993, *Restrepo 758* (MO); La Planada, S of Ricaurte, 7 km from Tumaco-Pasto Road, 01°10′N, 77°58′W, 1,800 m, 24 Jul 1986, *Gentry et al. 55057* (MO); Río Ñambí, Altaquer - Tumaco, Río Ñambí, 7 km W of Altaquer, 01°18′N, 78°04′W, 1,100–1,130 m, 20 Mar 1990, *Croat 71587* (MO, PSO). ECUADOR. **Carchi:** Río San Juan Valley Ortiz ranch between Peñas Blancas and El Pailón, N-facing slope below ridge crest above Río San Juan, 00°49′N, 78°09′W, 1,230–1,250 m, 10 Jun 1993, *B. Boyle et al. 2041* (MO); Cerro Golondrinas, Upper Río Pablo drainage, 00°53′N, 78°10′W, 1,740–1,780 m, 24 Apr 1993–02 May 1993, *B. Boyle & L. Dalmau 1759* (MO), Tulcan, Parroquia Tobar Donoso, Reserva Indígena Awá, Centro El Baboso, 00°53′N, 78°25′W, 1,800 m, 17–27 Aug 1992, *Galo Tipaz et al. 1887* (MO, QCNE); *1993* (MO, QCNE); *1983* (MO, QCNE); *1979* (MO, QCNE).

Anthurium scandens (Aubl.) Engler, *Fl. Bras.* 3(2): 78. 1878. Type: FRENCH GUIANA (Drawing by Plumier in Amer. Nascentium Icon. tab. 74. 1703 (BM, P).

Epiphytic; **stem** to ca. 60 cm long; **internodes** typically longer than broad, usually less than 2 cm long, ca. 3 mm diam.; **aerial roots** few drying light tan, well-branched, to ca. 15 cm long; **cataphylls** 2–3 cm long, tan to brown when dried, persisting as a fine reticulum of fibers; **petioles** less than 1 cm long (averaging .7 cm), 1 mm diam., sulcate; **blades** 3–6 cm long, .9–2.2 cm wide (averaging 4 × 1.4 cm), 2.9–3.1 times longer than broad, 4–4.5 times longer than the petioles, subcoriaceous, ovate-elliptic, apiculate at apex, acute to rounded at base, broadest at or near the middle, lower surface glandular-punctate; **midrib** acutely raised above, narrowly raised and paler below; **primary lateral veins** 3–10 or more per side, departing midrib at 35–40° angle, weakly sunken above, more or less obscure on both surfaces; **collective vein** arising near base, 3–5 mm from margins. INFLORESCENCES erect to spreading; **peduncle** 1.5–2 cm long, ca. 1 mm diam.; **spathe** green, oblong-lanceolate, reflexed, to ca. 5 mm long; **spadix** green, to ca. 1 cm long, 2–4 mm diam.

Anthurium scandens ranges widely from Mexico, Dominican Republic, Central America countries (Costa Rica, Nicaragua, Panama, Honduras, Belize) to Colombia (Antioquia, Chocó, Cundinamarca, Nariño, Risaralda, Santander, Valle del Cauca), Ecuador (Azuay, Bolívar, Carchi, Cotopaxi, El Oro, Esmeraldas, Guayas, Imbabura, Loja, Los Ríos, Manabí, Morona-Santiago, Napo, Pichincha, Tungurahua, Zamora-Chinchipe), Peru (Amazonas, Cajamarca, Huanuco, Pasco, San Martín, Tumbes) and Bolivia (La Paz, Santa Cruz) in the western Andes as well as Venezuela (Amazonas, Anzoategui, Bolivar, Carabobo, Lara, Sucre, Tachira, Trujillo, Yaracuy) and Brazil (Bahia, Espirito Santo, Minas Gerais, Paraná, São Paulo) in eastern South America at elevations of 100–2,200 m, in *Premontane moist forest, Tropical dry forest, Tropical moist forest, Premontane wet forest, Tropical wet forest, Premontane rain forest,*

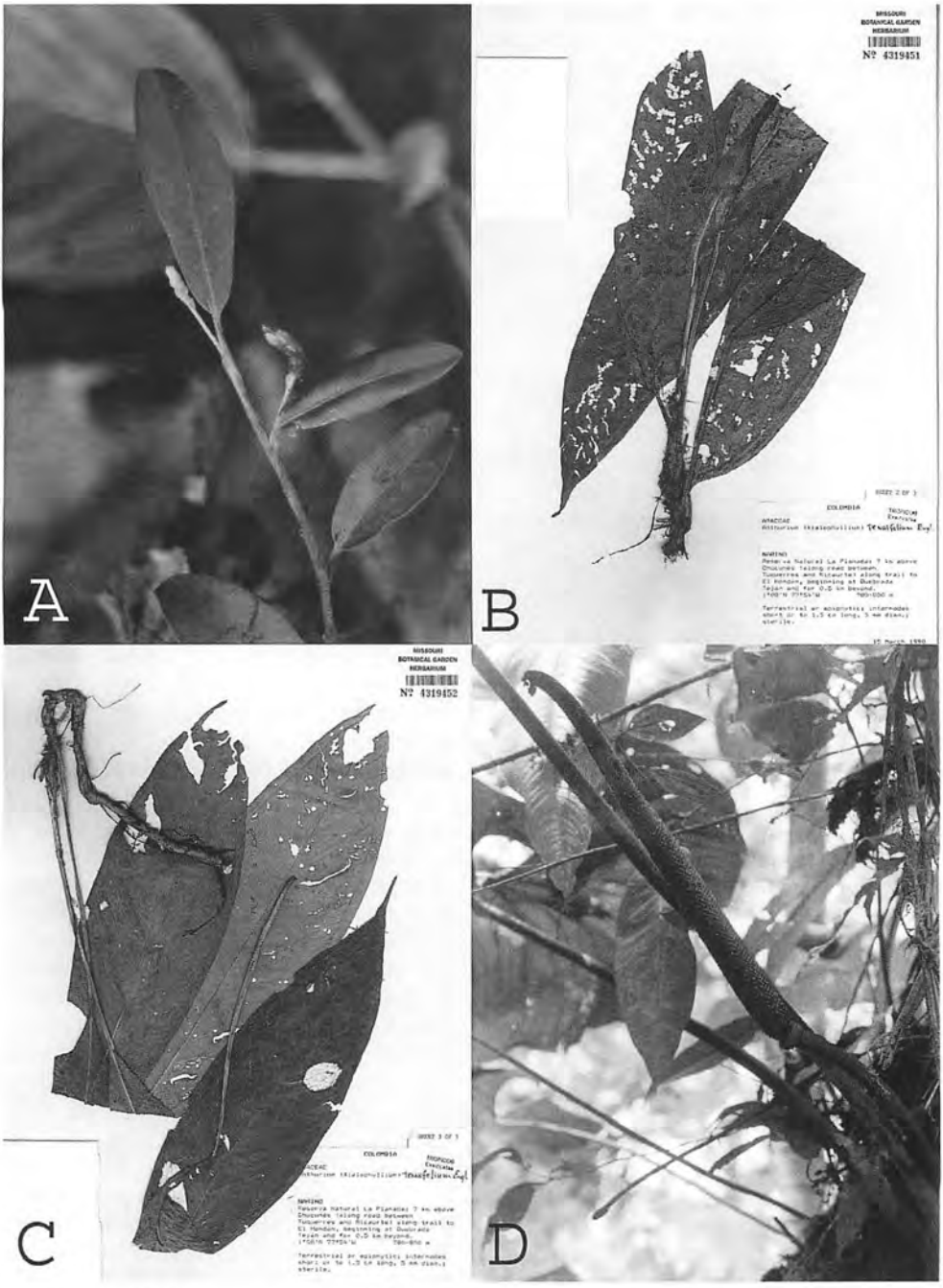

Fig. 29. a. *Anthurium scandens* (Aubl.) Engl. (*Croat 69651*). a. Stem showing leaves and inflorescence. b–c. *Anthurium tenuifolium* Engl. (*Croat 71489A*). b. Herbarium specimen. c. Herbarium specimen. d. *Anthurium umbraculum* Sodiro. (*Croat 69579*). d. Inflorescence showing spadix.

Lower montane dry forest and *Lower montane wet forest* life zones.

This taxon, the plant with the smallest leaves of all the aroids at La Planada, is a member of sect. *Tetraspermium*. It is characterized by its epiphytic habit, elongate internodes, cataphylls persisting as fibers, short, sulcate petioles, small ovate-elliptic blades, the green, reflexed spathe and the green, cylindroid spadix.

Anthurium scandens is similar to species in sect. *Porphyrochitonium* in having glandular punctations on the lower blade surface but differs from all other species in that section in that they usually have short internodes.

Anthurium scandens is a tetraploid species and is highly variable throughout its range but the material found at La Planada differs in being unusually small for the species while at the same time being distinct from the diploid *A. scandens* ssp. *pusilum* Sheffer.

Additional specimens examined: COLOMBIA. **Nariño:** Ricaurte, La Planada, 7 km above Chucunés on road between Tuquerres and Ricaurte, along trail to summit of hill behind Centro Cientifico, 01°05′N, 78°01′W, 1,780 m, 28 Jul 1988, *Croat 69651* (MO, PSO); 01°10′N, 77°58′W, 1,800 m, 2 Nov 1987, *Benavides 8845* (MO); Pielapi, 01°04′N, 78°02′W, 1,600–1,800 m, 22 Jul 1988, *Gentry et al. 63618* (MO); 01°05′N, 78°01′W, 1,800 m, 21 Dec 1987, *Gentry et al. 59682* (MO); Tumaco, Km 63 Tumaco-Pasto, Vereda El Carmen, 240 m, 19 Feb 1984, *Benavides 4273* (MO); Borde Marcos, 1,800 m, 2 Sep 1992, *Restrepo 599* (MO); ECUADOR. **Carchi:** Tulcan, Parroquia Tobar Donoso, Sector Sabalera, Reserva Indígena Awá, Noreste Casa Comunal, 01°00′N, 78°24′W, 650–1,000 m, 19–28 Jun 1992, *Galo Tipaz et al. 1366* (MO).

Anthurium subcarinatum Engl., *Pflanzenr. IV.* 23B (Heft 37):117. 1905. Type: COLOMBIA. Valle: Above Buga, 1,500 m, flowering in July 1881, *Lehmann 802* (holotype, B).

Epiphytic climber, somewhat scandent; **internodes** short, mostly slightly longer than broad, sometimes as long as broad, .6–1.7 cm long, drying minutely granular, gray-brown, matte to semiglossy, often finely ribbed; **cataphylls** 9–14 cm long, gray to brown, quickly weathering to few unorganized, usually short fibers, these light brown upon drying, promptly falling; **petioles** subterete to U-shaped, usually sulcate adaxially, 12.5–25 cm long (averaging 18.3 cm), 2–3 mm diam. at middle, drying greenish to yellow-brown; geniculum 1.5–2 cm long; **blades** narrowly oblong-elliptic, narrowly lanceolate or sometimes narrowly oblong-oblanceolate, narrowly long-acuminate at apex, acute to rounded or sometimes weakly cordulate at base, 24–47 cm long, 5–9.8 cm wide (averaging 34.8 × 7.2 cm), 3.8–6.8 times longer than wide, 1.7–2.8 times longer than the petioles, broadest at or near the middle, subcoriaceous, drying yellowish green to yellowish brown and matte on upper surface, grayish yellow-green to yellowish brown and semiglossy below; **midrib** sunken and concolorous above, paler and round-raised below; **primary lateral veins** sunken above, 20–25 per side; **collective vein** arising from near the base, running 2–4 mm from margin. INFLORESCENCES erect-spreading; **peduncle** 11–21 cm long, 1–3 mm diam., drying tan; **spathe** membranaceous, amber-colored or green tinged with pink, 3–8 cm long, 6–10 mm wide, linear-lanceolate, reflexed to spreading; **spadix** green or yellow or greenish yellow, sometimes green at base and yellow toward apex, becoming amber post-anthesis, weakly stipitate, straight or weakly curved, tapered, 4–8 cm long, 4–6 mm diam., weakly tapered toward apex. Flowers 5–6 visible per spiral, 1.7–1.9 mm long, 1.8–2.0 mm wide, lateral tepals .8–1.1 mm wide, broadly rounded, pistils weakly emergent, yellow-green. INFRUCTESCENCES with **berries** oblong-obovate with a conical style.

Anthurium subcarinatum is known from Colombia (Chocó, Valle, Cauca and Nariño) and Ecuador (Carchi) at (900)1,700–2,100 (2,500) m in *Premontane wet forest* and *Lower montane moist forest* life zone.

A member of sect. *Xialophyllium*, this species is distinguished by its moderately short internodes, oblong-lanceolate, green-drying blades with a moderately glossy amd veiny lower dried blade surfaces with the collective veins relatively close to the margin a well as by its moderately short, slightly tapered green spadix and spreading narrow green spathe.

The species is most similar to *Anthurium tenuifolium* Engl. but that species differs in drying matte on the lower surface and in having the tertiary venation on the lower surface not prominently raised but more or less obscure and in having the collective veins further from the margins, typically ca. 5–8 mm from the margins.

The species is also similar to *A. microspadix* but that species is more typically proportionately broader with leaves to 2.6–3 times longer than wide (at least at La Planada) rather than 3.8–6.8 times longer than wide as in *A. subcarinatum*.

Anthurium subcarinatum is also close to an apparently undescribed species represented by *Killip 7715* and *Killip 7723* from the Dept. of Cauca at La Gallera in the Micay River Valley at 1,400–1,500 m elevation. That specimen differs in having proportionately narrower blades which dry matte rather than semiglossy on the lower surface.

A Lehmann collection which lacks a number but has been assigned the letter "G" from Capilla was probably collected at one of two sites in Nariño (1°22′N 77°40′ W or 2°27′N, 78°06′W) or in Cauca at 2°35′N, 76°36′W. All three of these areas are called Capilla according to the Colombian Gazeteer.

Lehmann s.n. from Los Anayes between Popayan and Munchique at 2,000 m is probably also *A. subcarinatumi* but the blades are more broadly oblanceolate-elliptic and more abruptly acuminate at apex than any other collection.

Additional specimens examined: COLOMBIA. **Narino:** Ricaurte. La Planada: Trayecto Pialapi, 1°10′N, 77°58′W, 1,300–1,700 m, 23 Jul 1988, *Benavides 10148* (MO). ECUADOR. **Carchi**: Maldonado, Parroquia Tobar Donoso, Reserva Etnica Awá, Sabalera, 00°55′N, 78°32′W, 900 m, 22 Nov 1992, *C. Aulestia et al. 638* (MO, QCNE); Valle de Maldonado, Km 71 on road Tulcán-Maldonado, 00°54′N, 78°06′W, 2,100–2,200 m, 20 May 1973, *L.B. Holm-Nielsen et al. 5984* (AAU).

Anthurium tenuifolium Engler, *Bot. Jahrb. Syst.* 25: 413. 1898. Type: ECUADOR. Pichincha: Río Pilatón, 800–1,000 m Oct. 1883, *Sodiro s.n.* (B).

Terrestrial or epiphytic; **internodes** short or to 1.5 cm long, 5–8 mm diam., weakly sulcate; **cataphylls** to 11 cm long, more or less deciduous, or persisting as a weak, pale fiber bases; **petioles** 10–19.5 cm long (averaging 16.3 cm), 2–3 mm diam. at middle; **blades** oblong-lanceolate, acute at base, narrowly acuminate at apex, 24–45 cm long, 7–11 cm wide (averaging 31.8 × 8.7 cm), 3.2–4.1 times longer than broad, 1.7–2.3 times longer than the petioles; upper surface drying dark olive; lower surface drying moderately paler; **midrib** narrowly and weakly raised above upon drying, quite prominently and narrowly round-raised below; **primary lateral veins** 10–12 per side, departing midrib at 45°–60° angles, ascending to collective vein in a weak arc, more or less flat and moderately inconspicuous above, more prominent and narrowly raised below; **interprimary veins** nearly as conspicuous as primary lateral veins, especially below; **tertiary veins** in part raised below; **collective vein** about as prominent as primary lateral veins, 4–8 mm from margin; (venation all described from dried material); INFLORESCENCES erect or erect-spreading; **peduncle** 12–20 cm long, 1.5–2 mm diam. at middle; **spathe** 6–7 cm long, 1–1.2 cm wide, linear-lanceolate, acuminate at apex; **spadix** green, sessile, 6–8 cm long, 4–5 mm diam. Flowers 1.4–1.5 mm long, 1.6–1.8 mm wide.

Anthurium tenuifolium ranges from Colombia (Nariño, Valle del Cauca) to Ecuador (Carchi, Pichincha), at elevations of 250–2,400 m, primarily above 1,000 m, in *Lower montane moist forest*, *Lower montane wet forest* and *Premontane wet*

forest life zones. It is apparently quite rare at La Planada, having been collected there only once in a mixed collection, along the trail to El Hondon.

This species is a member of sect. *Xialophyllium* distinguished by its short internodes its relatively long cataphylls which persist as a few basal fibers, its oblong-oblanceolate blades which have their collective vein which is quite remote from the margin as well as by the green, sessile spadix.

Anthurium tenuifolium appears to be closest to *A. subcarinatum* which is also part of the La Planada Flora.

It is also similar to three undetermined collections, one from Valle Dept. (*Ramos 1828* near La Cumbre) in Colombia and two from Carchi Dept. (*van der Werff & Gudiño 10815* and *Dorr & Barnett 6095* from Maldonado) in Ecuador. They differ in having blades that are much glossier on the lower surface with more prominulous tertiary veins.

Anthurium tenuifolium is also similar to an unknown species from Nariño Dept. in Colombia and from Carchi Province in Ecuador. That species differs in having more numerous primary lateral veins (more than 25 pairs) which are more closely aggregated near the base. Examples are *Croat 72402* Río Ñambí at 1,100 m,, *Sneidern 550* from Ricáurte at 1,300 m in Nariño Dept. and *Gentry & Gene Schupp 26541* at Chical 1,300–1,500 m and *Hoover et al. 2436* along the trail from Paílon to Gualpí Chico at 1,000–1,450 m.

Additional specimens examined: COLOMBIA. **Nariño:** Ricaurte, La Planada, Tuquerres - Ricaurte, 7 km above Chucunés along trail to El Hondón, beginning at Quebrada Tejón and for .5 km beyond, 01°08′N, 77°54′W, 780–800 m, 15 Mar 1990, *Croat 71489A* (MO, PSO); ECUADOR. **Carchi:** Above Maldonado, 2,400 m, 31 Jul 1989, *van der Werff, Edgar Gudiño 10815* (MO); Quebrada Naranjo, 00°54′N, 78°06′W, 2,000 m, 13 Nov 1988, *L.J. Dorr & L.C. Barnett 6095* (MO, NY, QCA, QCNE), Tulcan, Parroquia Tobar Donoso, Sector Sabalera, Reserva Indígena Awá, 01°00′N, 78°24′W, 650–1,000 m, 19–28 Jun 1992, *Galo Tipaz et al.. 1457* (MO, QCNE); *1405* (MO, QCNE); 00°53′N, 78°25′W, 1,800 m, 17–27Aug 1992, *Galo Tipaz et al. 2009* (MO, QCNE).

Anthurium terracolum Croat **sp. nov.**

Type: COLOMBIA. Nariño: La Planada, 7 km above Chucunés, on road between Tuquerres and Ricaurte, along the trail above La Posada, 1°05′N, 1,780 m, 26 July 1988, *Croat 69585* (holotype, MO-3635126–7; isotypes, AAU, B, BR, C, CAS, COL, CUVC, DUKE, F, G, GB, GH, GOET, HUA, IMB, INPA, K, L, LE, M, MEXU, MICH, NY, P, PMA, PSO, QCNE, RSA, RJ, S, SEL, TEFH, TEX, UB, US, VEN, W).

Internodia 1.5–5.5 cm longa, 4–5 mm diam.; cataphyllum persistens in fibris, 3–4 cm longa; petiolus 3–8.5 cm longus,1–2 mm diam., sharply C-formatus, sulcatus; lamina ovato-elliptica, 7–16 cm longa, 3–6.5 cm lata; nervis primariis lateralibus 9–11 utroque; spatha viridis vel cremeus; spadix viridis, 2–4 cm longus, 2–3 mm diam.; stipes usque 3.5 cm longus; baccae virides.

Terrestrial; **internodes** 1.5–5.5 cm long, 4–5 mm diam.; **cataphylls** persisting as fibers, intact at upper nodes, 3–4 cm long, drying tan; **petioles** 3–8.5 cm long (averaging 5.4 cm), 1–2 mm diam., erect-spreading, sharply C-shaped, sulcate; **blades** ovate-elliptic, acuminate at apex, rounded at base, 7–16 cm long, 3–6.5 cm wide (averaging 11.4 × 5 cm), 1.9–2.5 times longer than broad, 1.5–3.5 times longer than the petioles, broadest at or somewhat below middle, thinly coriaceous; upper surface dark green and matte; lower surface moderately paler and weakly glossy, sometimes bicolorous; **midrib** narrow, convex, and moderately paler above, acute and slightly paler below; **primary lateral veins** 9–11 per side, departing midrib at 60°–75° angles, etched above, weakly raised below; **collective vein** arising from near base, 3–6 mm from margin; INFLORESCENCES erect; **peduncle** 7–12 cm long, 1.5 mm diam.; **spathe** erect, green to cream, clasping elongated

Fig. 30. a–b. *Anthurium terracolum* Croat. (*Croat 69585*). a. Habit. b. Leaf blade, adaxial surface. c. *Anthurium umbraculum* Sodiro. *Croat 69579*). c. Habit. d. *Anthurium versicolor* Sodiro. (*Croat 69567*). d. Habit.

peduncle/stipe; **spadix** green, becoming weakly tinged purple, cylindroid, 2–4 cm long, 2–3 mm diam.; **stipe** to ca. 3.5 cm long. Flowers 2–3 per primary spiral, 1.1–1.3 mm long, 1.0–1.2 mm wide. INFRUCTESCENCES with **berries** pale green at base, dark green at apex, longer in one dimension (4×5 mm wide, 3.5 mm high), depressed apically; seeds 2 per berry, oblong-elliptic, 3 mm long, 2 mm diam., tan.

Anthurium terracolum is currently known from Colombia (Cauca, Nariño, Risaralda, Tolima, Valle del Cauca) to Ecuador (Napo and Carchi), at elevations of 1,750–2,450 m, in *Lower montane rain forest*, *Lower montane wet forest* and *Premontane wet forest*. In La Planada, it is found in regrowth secondary forest with elements of primary forest, along the trail above La Posada and along the trail to El Hondón.

This species is a member of sect. *Xialophyllium*, and is recognized by its internodes longer than broad, persistent cataphyll fibers, C-shaped petioles, and small nearly elliptic epunctate blades, short-acuminate at apex with a pair of prominent collective veins and usually a second pair of collective veins near the base and finally by its long stipitate, slender spadix.

Anthurium terracolum is similar to *A. gracilistipum*, which also has long-stipitate spadices. *A. gracilistipum* differs in being usually epiphytic and having longer internodes, intact cataphylls on upper nodes and more near ovate blades, while *A. terracolum* is almost exclusively terrestrial, and has short internodes, fibrous cataphylls and more near elliptic blades.

A collection from the Dept. of Huila (*Fosberg 19944*) from the Cordillera Oriental at 2,300 m in the headwaters of Río Villalobos along the border of Huila and Cauca boundary may also be this species but it differs in lacking cataphyll fibers and in having blades which dry pale grayish

green on the lower surface. The *Foster 19944* collection is very similar to a collection (*Jorgenson 61977*) from Napo Province in Ecuador near Cosanga at 2,150 m. They both perhaps represent another new species.

The epithet "terracolum" refers to the almost exclusively terrestrially habitat.

Paratypes: COLOMBIA. **Nariño:** Ricaurte, La Planada, 01°10′N, 77°58′W, 16 Jan 1990, *Benavides 11167* (MO); 01°10′N, 77°58′W, 1,800 m, 25 Sep 1989, *10810* (MO); 01°08′N, 77°58′W, 1,750 m, 29 Nov 1981, *Gentry 35193* (COL, MO); 01°10′N, 77°58′W, 1,800 m, 24 Jul 1986, *Gentry et al. 10810* (MO); 2 km siguierdo el caril divisorio, 01°10′18″N, 78°00′09″W, 1,820 m, 2 Feb 1997, *G. Herrera 9344* (MO); Pialapi, 01°10′N, 77°55′W, 1,800–1,900 m, 6 Aug 1990, *Luteyn & D. Stella Sylva S. 13879* (MO, NY,US); 01°09′37″N, 77°59′13″W, *G. Herrera 9652* (PSO); 01°10′00″N, 77°55′00″W, 1,800 m, 15 May 1992, (MO); Borde Pialapi, 01°10′00″N, 77°55′00″W, 1,800 m, 18 Nov 1993, *791* (MO); 01°10′00″N, 77°55′00″W, 1,800 m, 20 Jul 1992, *C. Restrepo & G. Ramírez 583* (MO); 01°05′N, 78°01′W, 1,800 m, 22 Dec 1987, *Gentry & P. Keating 59718* (MO); Trail to El Hondón, 5–12 km SW of La Planada, 01°04′N, 78°02′W, 1,750–1,800 m, 6 Jan 1988, *Gentry, Benavides & P. Keating 60508* (MO). ECUADOR. **Carchi:** Awá Encampment, trail to Río Gualpí Chico 00°58′N, 78°16′W, 1,330 m, 17 Jan 1988, *W. S. Hoover et al. 2546* (MO, QCA); Espejo, El Gualtal, Faldas de Cerro Golondrina Hembra, 00°51′N, 78°07′W, 2,450 m, 21 Aug 1994, *W. Palacios & J. Clark 12671* (CAS, COL, K, MEXU, MO, QCNE, SEL).

Anthurium umbraculum Sodiro, *Anales Univ. Centr.* Ecuador 15(108): 11. 1901. Lectotype: ECUADOR. Nono, *Sodiro s.n.* (hololectotype, MO).

Hemiepiphytic, appressed epiphyte, or sometimes terrestrial; **internodes** short, to 4 cm long, .6–3.7 cm diam.; **cataphylls** thin, to 20 cm long, drying tan to red-brown, deciduous or persisting as a rotten, black, formless mass on stems; **petioles** 40–80 (125) cm long (averaging 78.3 cm), 7–12 mm diam., terete, narrowly and obtusely sulcate, medium green, semiglossy; geniculum much swollen, weakly sulcate, 1.5–3.5 cm long; **blades** cordate, ovate-triangular, narrowly acuminate at apex, (34–) 50–90 cm long, (23–) 30–66 cm wide (averaging 62 × 43 cm), 1.4–1.7 times longer than broad, .7–.9 times longer than the petioles, broadest somewhat below point of petiole attachment, subcoriaceous, convex at the margins; **anterior lobe** 31–65 cm long, 30–66 cm wide; **posterior lobe** 10–26 cm long, 11–30 cm wide, directed inward; **sinus** spathulate, 7.5–24 cm deep; upper surface dark green, matte, raised below, darker than surface; collective vein originating from near base, 2–3 mm from margin; INFLORESCENCES spreading; **peduncle** 25–33 cm long, 4–5 mm diam.; **spathe** chartaceous, spreading, pale green, brittle, 12–28 cm long, 1.5–2.5 cm wide; **spadix** green, tinged with red, becoming yellowish brown at anthesis, weakly glossy, curved, tapered, 18–28 cm long, 8–13 mm diam. at base, 3–6 mm at apex; tepals moderately glossy; pistils weakly exserted; pollen yellow-orange. Flowers 6–8 per primary spiral, 1.3–1.7 mm long, 1.6–2.0 mm wide.

Anthurium umbraculum ranges from Colombia (Nariño) to Ecuador (Azuay, Bolívar, Carchi, Chimborazo, Cotopaxi, Esmeraldas, Guayas, Imbabura, Morona-Santiago, Napo, Pastaza, Pichincha, Sucumbios, Tungurahua), at elevations of 850–2,600 m (mostly above 1,700 m), in *Montane moist forest*, *Montane wet forest* and *Premontane wet forest*. It is been particularly well developed on the Pacific slope of Volcán Pichincha. It is relatively common throughout the area of La Planada study site and has been also collected in Nariño at lower elevations.

This species is a member of sect. *Polyneurium*. It is recognized by its short internodes, cataphylls persisting as a rotten, black, formless mass on stems, the terete, narrowly and obtusely sulcate petioles, the more or less ovate, velvety leaf blades with numerous primary lateral veins which are close and raised in valleys as well as the

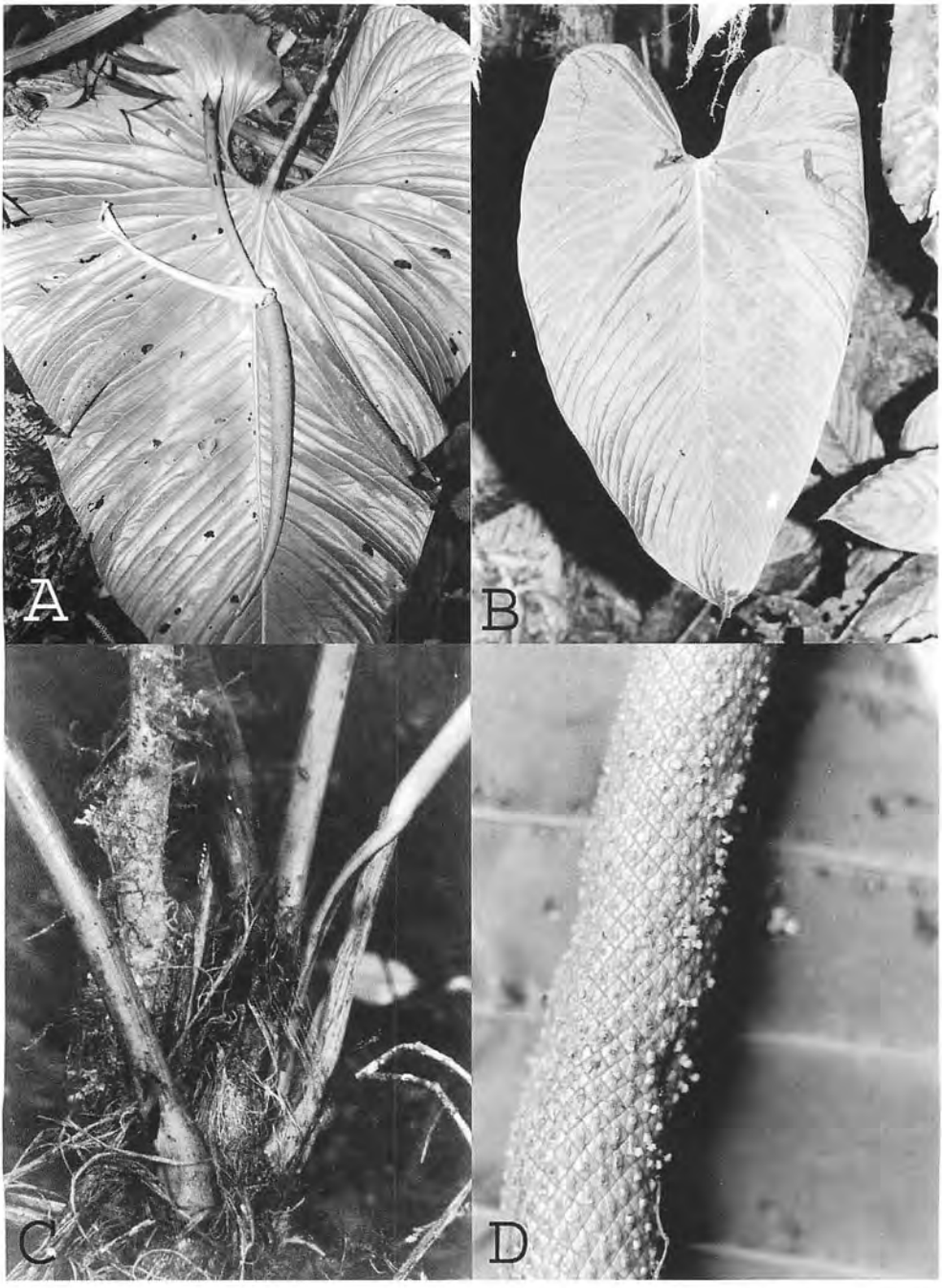

Fig. 31. a–d. *Anthurium umbraculum* Sodiro. (*Croat 69579*). a. Leaf blade, abaxial surface with inflorescence. b. Leaf blade, adaxial surface. c. Stem showing cataphylls and base of petioles. d. Detail of spadix.

green, brittle spathes and the yellowish brown spadices.

Anthurium umbraculum is probably most easily confused with *A. dolichostachyum* (a species thus far not found at La Planada) owing to its similar stem with mostly deciduous cataphylls, petioles and blades of similar size and shape and the sometimes pale green inflorescence with a broad, brittle spathe. That species differs in having the berries red rather than greenish.

Anthurium umbraculum is also similar to *A. pulverulentum*, but that species differs in having smaller blades which lack raised primary lateral veins and dry lighter green instead of blackish and in having stems with longer, more slender internodes which dry with many close, perpendicular fissures and with more persistent pale cataphyll fibers persisting.

Anthurium umbraculum as it occurs at La Planada has blades with the lower surface having less conspicuously raised veins than does material of the species in the type locality on Volcán Pichincha in Central Ecuador but otherwise the characteristics present fit those of *A. umbraculum*.

Additional specimens examined: COLOMBIA. **Nariño:** Valley of Río Guiza; road from El Espino to Tumaco, ca. 16 km W of Ricaurte, 01°15′N, 78°06′W, 850 m, 7 Dec 1988, *B. Hammel 17137* (CM, MO); 01°09′37″N, 77°59′13″W, 1,850–1,950 m, 19 Jun 1996, *Bittner et al. 2554* (MO, PSO); . *2524* (MO, PSO); Quebrada Tejón and for .5 km beyond, 01°08′N, 77°54′W, 780–800 m, 15 Mar 1990, *Croat 71492* (MO, PSO); 01°06′N, 77°53′W, 1,700 m, 10 Mar 1990, *38830* (MO, PSO); *38715* (MO, PSO); 01°09′37″N, 77°59′13″W, *G. Herrera 9509* (PSO); Altaquer-Tumaco, between Altaquer-Junín, 7 km W of Altaquer, Río Ñambí, 01°18′N, 78°04′W, 1,100 m, 21 Mar 1990, *Croat 71701* (MO, PSO); Borde Celimo, 1,800 m, 17 Nov 1993, *Restrepo 768* (MO); 01°06′N, 77°54′W, 1,780–1,850 m, 8 Mar 1990, *Croat 71194* (CUVC, HUA, MO, PSO); La Posada, 01°05′N, 78°01′W, 1,780 m, 26 Jul 1988, *Croat 69579* (AAU, B, COL, CUVC, HUA, K, MO, PSO, QCNE, UB, US, VEN); 01°10′00″N, 77°55′00″W, 1,800 m, 17 Nov 1993, *Restrepo & A. Ortega 768* (MO); Transect 7, 01°10′N, 77°58′W, 1,800 m, 24 Jul 1986, *Gentry & Benavides 55046* (MO); 01°06′N, 77°54′W, 1,780–1,850 m, 7 Mar 1990, *Croat 71176A* (MO, PSO). ECUADOR. **Carchi:** Carretero Tulcan-Tufino, sector La Pradera, 2,200 m, 12 Oct 1986, *Ulloa 257* (QCA); Cerro Golondrinas, Upper Río Gualpí headwaters, 00°50′N, 78°13′W, 2,250–2,265 m, 15–20 July 1993, *B. Boyle et al. 2243* (MO).

Anthurium umbricola Engl., *Bot. Jahrb. Syst.* 25: 407. 1898. Type: COLOMBIA. Cauca: Western Cordillera of the Andes near Popayan, elev. 1,400–1,800 m, *Lehmann 5323* (B).

Anthurium umbricolum Engl. var. *rupicolum Engl. Bot. Jahrb. Syst.* 25: 407. 1898. Type: Ecuador. El Entable at Naranjal, 200–600 m, *Lehmann 7751* (B).

Anthurium spathulatum Sodiro, *Anales Univ. Centr.* Ecuador 15 (108): 6. 1901. Type: Ecuador. Pichincha: in forest on Western Cordillera near Angamarca, *Sodiro s.n.* (B).

Anthurium espinosanum A.D. Hawkes, *Lloydia* 14: 98, Fig. 1. 1951. Type: Ecuador. Loja: Torata on road to Santa Rosa, *Reinaldo Espinosa 1177* (UC).

Terrestrial or epiphytic; **plants** 30–150 cm tall; **internodes** 2.5–4 cm long, 5–10 mm diam., drying black; **cataphylls** 4–6 cm long, drying reddish brown, persisting semi-intact or as a reticulum of fibers at upper nodes, as a loosely organized reticulum of fibers lower nodes; **petioles** 12–28(42) cm long (averaging 20.3 cm), 2–4 mm diam., erect-spreading, drying dark brown, C-shaped, bluntly D-shaped with weakly erect margins, ranging from having a weak medial rib to being canaliculate; geniculum 1–1.3 cm long, drying black, darker than petiole or blade; **blades** narrowly ovate to ovate-elliptic, acuminate at apex, acute to rounded at base, 12–24 cm long, 7–13 cm wide (averaging 20 × 10 cm), 1.7–2.6 times longer than broad, .6–1.4 times longer than the petioles,

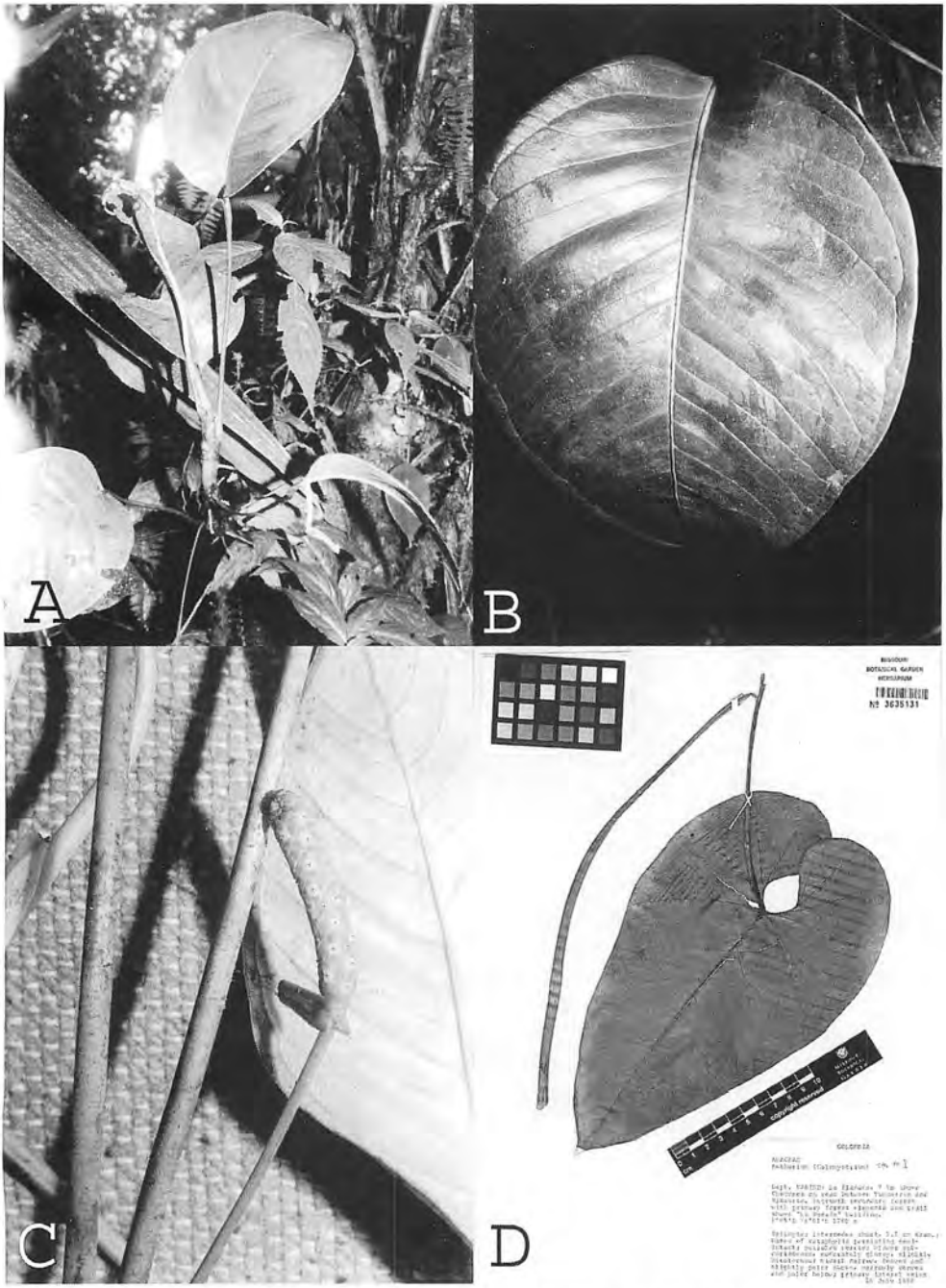

Fig. 32. a–c. *Anthurium umbricola* Engl. (*Croat 69605*). a. Habit. b. Leaf blade, adaxial surface. c. Inflorescence showing spadix. d. *Anthurium species unknown # 1*. (*Croat 69582*). d. Herbarium specimen.

broadest at or somewhat below middle, subcoriaceous to thinly coriaceous; both surfaces semiglossy, moderately bicolorous; upper surface drying dark reddish brown, lower surface drying moderately paler; **midrib** narrowly convex and slightly paler above, acute and slightly paler below, drying dark brown, similar in color to petiole below; **primary lateral veins** 11–14 per side, departing midrib at 45°–60° angles, etched to etched-sunken above, convex below; **interprimary veins** almost as prominent as primary lateral veins; **collective vein** arising from one of first primary lateral veins, 2–4 mm from margin; INFLORESCENCES erect to erect-spreading; **peduncle** 18–36 cm long, 1–3 mm diam., drying a medium reddish brown; **spathe** spreading to reflexed, chartaceous, green or reddish, linear, curled down along margins, 2–5 cm long, 2–3 mm wide; **spadix** medium green, stipitate, cylindroid, 5–6 cm long, 2–4 mm diam.; tepals medium green, semiglossy; pistils yellowish. INFRUCTESCENCES (not fully mature) with tepals dark green, widely separated from one another; **berries** white, weakly emergent.

Anthurium umbricola ranges from Colombia (Antioquia, Cauca, Nariño, Valle del Cauca) to Ecuador (Azuay, Bolívar, Cañar, Cotopaxi, El Oro, Esmeraldas, Guayas, Los Ríos, Manabí, Pichincha), at elevations of 250–2,100 m in *Tropical dry forest, Premontane dry forest, Premontane wet forest, Tropical wet forest, Premontane rain forest* and *Lower montane dry forest.* This species is quite common throughout La Planada.

A member of sect. *Porphyrochitonium*, this species is apparently quite variable especially in blade shape and venation, but it is characterized by its typically terrestrial habit, C- to D-shaped petioles exceeding more or less ovate, black-drying blades which are acute to rounded at base. Also characteristic is the short spadix.

Additional specimens examined: COLOMBIA. **Nariño:** Ricaurte, La Planada, Salazar Finca 7 km above Ricaurte, 01°08′N, 77°58′W, 1,750 m, 26 Nov 1981, *Gentry 35046* (COL, MO); 29 Nov 1981, *Gentry 35199* (COL); Camino a Piliapí cerca quebradar del mar, 01°09′55″N, 77°58′44″W, 1,850 m, 20 Jan 1997, *G. Herrera & Bittner 9153* (MO); Cerro León, 01°10′18″N, 78°00′09″W, 1,850 m, 13 Feb 1997, *G. Herrera & Bittner 9395* (MO); San Isidro, Las Cruces, Cabeceras Hondonadas de quebradas que dan a Corcuel, 01°10′18″N, 78°00′09″W, 1,600 m, 5 Jun 1997, *9665* (MO); Trail to Pialapi to Quebrada La Calledita, 01°10′N, 77°55′W, 1,800–1,900 m, 7 Aug 1990, *Luteyn & D. Stella Sylva S. 13918* (MO, NY); Borde Pialapí, 1,800 m, 12 Nov 1993, *Restrepo 671A* (MO); 01°04′N, 78°02′W, 1,600–1,800 m, 22 Jul 1988, *Gentry, Benavides, C. Samper et al. 63600* (MO); *63604* (MO); La Planada, 7 km above Chucunés on road between Tuquerres and Ricaurte, along trail above La Posada, 01°05′N, 78°01′W, 1,780 m, 27 Jul 1988, *Croat 69605* (B, COL, K, M, MO, NY, PSO, QCNE, US); Quebradas, El Mar - La Calladita, 01°10′N, 77°58′W, 17 Jan 1988, *Benavides 11249* (MO); 01°10′N, 77°58′W, 29 Apr 1988, *9542* (MO).

Anthurium versicolor Sodiro, *Anales Univ. Centr.* Ecuador 15(108): 13. 1901. Type: ECUADOR. Napo: Río Masfa, between Cujujua and Baeza, *Sodiro s.n.* (lectotype, QPLS). For complete synonymy see Croat (1999).

Appressed epiphyte, climber, or sometimes terrestrial; **juvenile plants** with **petioles** 14–18 cm long, 1–2 mm diam.; **blades** triangular-ovate, cordate, 10–16 cm long, 4–8 cm wide; **adults** with **internodes** 3–10 cm long, 2–3.7 cm diam., medium green to gray-green, eventually turning brownish, semiglossy, becoming densely transversely fissured; **cataphylls** mushy at upper nodes, persisting as the basal portion of pale fibers or deciduous, drying reddish brown; **petioles** (37)43–86 cm long (averaging 56.1 cm), drying 6–11 mm diam., erect-spreading, terete or obscurely and narrowly sulcate, medium green, semiglossy; **blades** ovate-cordate, acuminate at apex, 35–84 cm long, 23–44 cm wide (averaging 53 × 32 cm), 1.4–1.9 times longer than broad, .7–1.3 times longer than the petioles, broadest just

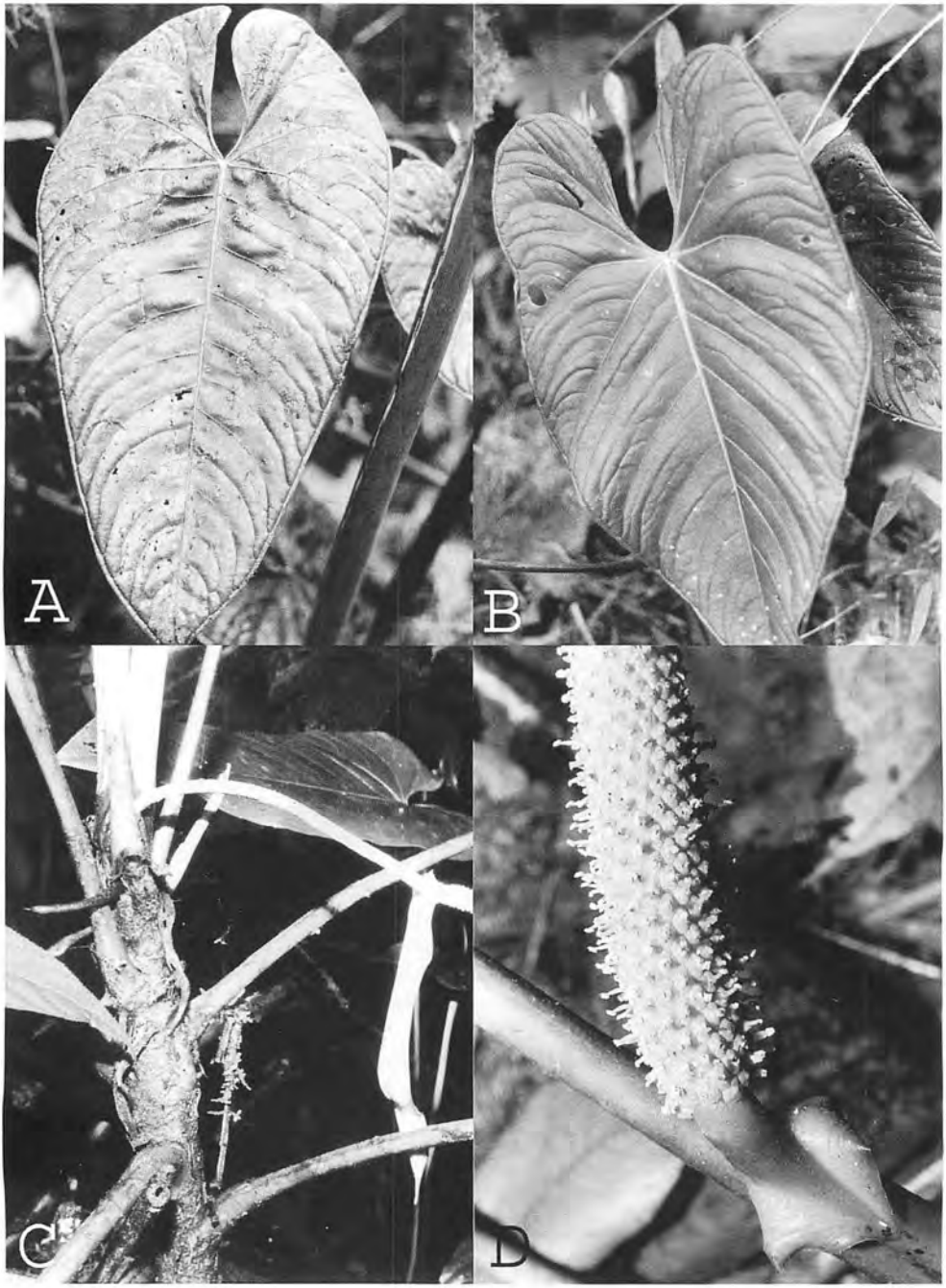

Fig. 33. a–d. *Anthurium versicolor* Sodiro. a–b & d. (*Croat 69567*). a. Leaf blade, adaxial surface. b. Leaf blade, adaxial surface. c. Stem showing cataphylls, base of petioles and inflorescence. (*Croat 71626*). d. Inflorescence showing base of spadix and part of spathe.

above point of petiole attachment, subcoriaceous, convex at margins; lower surface slightly to moderately paler, matte to weakly glossy, drying light to medium olive above, lighter, often with a golden sheen below; **anterior lobe** 24–64 cm long; **posterior lobes** 12–23 cm long, 9–18 cm wide, directed inward; **sinus** spathulate, 10–18 cm deep, 2–5(8) cm wide; upper surface dark green, matte with a velvety sheen; **midrib** acute and slightly paler above, convex or narrowly rounded, paler and weakly ridged below; **basal veins** 6–8 pair, raised on both surfaces, at least upon drying, the first 2 or 3 free to base, the remainder coalesced for 2–7 cm; **posterior rib** naked for 2–6 cm (along most of length); **primary lateral veins** 8–15 per side, departing midrib at 45°–60° angles, ascending to the collective vein, acutely and prominently raised and slightly paler above, narrowly to acutely raised and often slightly paler below; **tertiary veins** in part sunken above, raised below; **collective vein** usually arising from one of lowermost basal veins, as prominent as the primary lateral veins, 2–5 mm from margin; INFLORESCENCES erect; **peduncle** 15–35 (–75) cm long, 3–7 mm diam.; **spathe** lanceolate to oblong, light green to medium green, reflexed, semiglossy, 8–12 cm long, 3–4 cm wide; **spadix** yellow-green to medium green or whitish, semiglossy, slightly tapered to apex, erect to curved, depending upon age, 5–9 cm long, 5–7 mm diam. at base tapered to 4–5 mm diam. at apex; tepals paler and matte at anthesis, turned somewhat upward; pistils early emergent; pollen orange. INFRUCTESCENCES 19–22 cm long, 15–16 cm diam. at base tapered to 12–14 cm diam. at apex.

Anthurium versicolor ranges from Colombia (Antioquia, Cauca, Chocó, Cundinamarca, Nariño, Risaralda, Valle del Cauca), Ecuador (Azuay, Bolívar, Cañar, Carchi, Chimborazo, Cotopaxi, El Oro, Esmeraldas, Imbabura, Loja, Los Ríos, Morona-Santiago, Napo, Pastaza, Pichincha, Sucumbios, Tungurahua, Zamora-Chinchipe), Peru (Amazonas, Cajamarca, Cusco, Huanuco, Junín, Loreto, Madre de Dios, Pasco, San Martín, Ucayali) and Bolivia (Cochabamba, La Paz), at elevations of 180–3,200 m, primarily from 900–1,900 m, in *Tropical dry forest, Premontane wet forest, Tropical wet forest, Premontane rain forest, Lower montane dry forest* and *Lower montane rain forest* life zones. The species is common in Pichincha Province and has also been collected in Carchi Province at 1,800 m. It is unusual in also ranging to the Amazon basin with a few collections in Pastaza and Morona-Chinchipe. At La Planada, it is common in both regrowth forest and primary forest.

The type locality of the species is on the eastern slopes of the Andes at Río Masfa, along the road between Quito and Baeza. Though the Río Masfa collection has not been seen, a second collection cited by Sodiro from Nono is an excellent match for the La Planada material.

The species is of uncertain sectional affinity. This species is most easily distinguished by its smooth, green stems which are largely devoid of cataphyll fibers, by its somewhat velvety matte upper blade surface and the slightly tapered greenish spadix with the tepals turned somewhat upward. It flowers usually as an epiphyte at less than 3 m in trees.

Anthurium versicolor is similar to *A. azuayense* Croat sp. nov. ined., which has blades which are of similar coloration and texture upon drying and has similar cataphylls. It differs in having primary lateral veins merely convex on the upper surface, not thicker than broad upon drying. It also has smaller flowers and sometimes has a purplish spadix (at least when young). The latter species is from Azuay and Cotopaxi Province at 2,000–2,800 m (higher than most *A. versicolor*).

Additional specimens examined: COLOMBIA. **Nariño:** Barbacoas, Reserva Natural Río Ñambí, Corregimiento Altaquer, Vereda El Barro, Río Ñambí, 01°18′N, 78°08′W, 1,325 m, 4 Dec 1993, *J. Betancur et al. 4529* (MO); 10 Dec 1993, *P. Franco et al. 5117* (MO); Ricaurte, Río Imbi Valley, Pasto-Tumaco, Vicinity of "Palmar", in valley of Río Imbi, 3 km NW of Ricaurte, 01°08′N, 77°56′W, 1,100 m, 14 Mar 1990,

Croat 71412 (AAU, B, BR, CM, COL, F, GH, L, MEXU, MO, NY, PSO, QCA, RSA, TEX, US, VEN, WIS); *71429* (ENCB, LE, MO, PSO); 01°08′N, 77°58′W, 1,750 m, 29 Nov 1981, *Gentry et al. 35198* (COL, MO); *35179* (COL, MO); 01°10′N, 77°58′W, 1,800 m, 26 Sep 1989, *Benavides 10891* (MO); 01°06′00″N, 77°53′00″W, 1,950 m, 13 Jan 1981, *Gentry et al. 30606* (MO); 01°09′37″N, 77°59′13″W, 1,850–1,950 m, 19 Jun 1996, *Bittner et al. 2552* (MO, PSO); *2550* (MO, PSO); Quebrada El Balsal, 01°10′18″N, 78°00′09″W, 2,148 m, 21 Mar 1997, *G. Herrera & Bittner 9511* (MO); La Planada Trail E of La Posada, 01°09′55″N, 77°58′44″W, 1,850 m, 17 Jul 1994, *Bittner et al. 2608* (MO); 01°09′37″N, 77°59′13″W, 1,850–1,900 m, 18 Jul 1996, *Bittner et al. 2611* (MO); 01°10′N, 77°58′W, 1,800 m, 24 Jul 1986, *Gentry et al. 55061* (MO); Borde Marcos, 1,800 m, 15 Nov 1993, *Restrepo 755* (MO); La Rosa to Potrero de Hermógenes, 01°06′N, 77°53′W, 1,800–1,850 m, 13 Mar 1990, *Croat 71386* (CHOCO, HUA, MO, PSO); La Posada, 01°05′N, 78°01′W, 1,780 m, 26 July 1988, *Croat 69567* (AAU, COL, CM, F, K, L, MEXU, MO, P, PSO, PMA, QCA, SEL, US, VEN); 01°05′N, 78°01′W, 1,780 m, 27 Jul 1988, *Croat 69603* (MO, PSO); 01°05′N, 78°01′W, 7 Jan 1988, *Gentry et al. 60564* (MO); Trayecto San Isidro-La Planada, 01°10′N, 77°58′W, 1,500–1,800 m, 13 Feb 1988, *Benavides 9175* (MO); Borde Marcos, 01°10′00″N, 77°55′00″W, 1,800 m, 15 Nov 1993, *Restrepo 755* (MO); Vertiente Occidental, 01°10′26″N, 77°58′46″W, 1,800 m, 02 Aug 1992, *N. Paz 310A* (CUVC); Río Ñambí, Altaquer-Tumaco, 01°18′N, 78°04′W, 1,100–1,130 m, 20 Mar 1990, *Croat 71626* (AAU, CUVC, GB, HUA, MO, PSO). ECUADOR. **Carchi:** San Marcos Valley, 01°7′N, 78°22′W, 600 m, 20–24 Nov 1983, *Barfod et al. 48881* (AAU); 00°52′N, 78°08′W, 1,840 m, 29 Nov 1987, *W. S. Hoover 2059* (MO); Cerro Golondrinas, Upper Río Gualpí headwaters, N-facing slope beyond (to N of) ridge crest at 2,300 m which rises above the settlements of El Carmen and La Primavera, 00°50′N, 78°13′W, 2,250–2,265 m, 15–20 Jul 1993, *B. Boyle et al. 2201* (MO, QCNE, US); Cerro Golondrinas, Upper Río Pablo drainage, 00°52′N, 78°10′W, 1,730–1,760 m, 14 Apr 1993, *B. Boyle et al. 1631* (MO, CAS); *1661* (MO); Maldonado, Tobar Donoso, Reserva Etnica Awá, Sabalera, 00°55′N, 78°32′W, 900 m, 22 Nov 1992, *Carlos Aulestia et al. 721* (MO); *631* (MO); Chical, 00°56′N, 78°11′W, 1,200–1,250 m, 08 Aug 1983, *Thompson & John E. Rawlins 993* (MO); 7.8 mi. SE of Maldonado on road to Tulcan, 00°53′N, 78°05′W, 2,400 m, 27 Jul 1983, *887* (CM); Cerro Golondrinas, valley bottom ca. 1 km NNE of summit, 00°51′38″N, 78°8′14″W, 2,740 m, 20 Jul 1994, *B. Boyle et al. 3344* (MO); N side of Río Mira, across from Lita 00°53′N, 78°27′W, 750 m, 11 Aug 1994, *B. Boyle & A. Boyle 3527* (MO); Vicinity of Peñas Blancas, 6.6 km N of El Chical along trail to Tobar Donoso, 00°58′38″N, 78°11′53″W, 1,100 m, 18 Feb 2005, *Croa et al. 94881* (MO); 4.4 km W of Chilma, 00°52′50″N, 78°04′06″W, 2,097 m, 19 Feb 2004, *95000* (MO); Along road between El Chical and El Carmen departing main El Chical-Peñas Blancas Road, .6 km W of Río Chical Bridge, 3.8 km S of main road, 00°59′01″N, 78°11′37″W, 1,300 m, 9 Aug 2004, *Croat 95392* (MO, PSO); San Marcos, 01°08′N, 78°20′W, 600 m, 8 Jul 1983, *Thompson, J. et al. 788* (CM); Awá Encampment, Gualpí Chico, 00°58′N, 78°16′W, 1,330 m, 15 Jan 1988, *W. S. Hoover et al. 3230* (MO); 00°58′N, 78°16′W, 1,330 m, 18 Jan 1988, *2758* (MO); Tulcan, Arriba de Maldonado, Frontera con Colombia, Sitio Chilmá, 00°51′N, 78°02′W, 2,000 m, 20 May 1991, *W. Palacios & D. Rubio 7307* (MO); Tobar Donoso, Sector Sabalera, 01°00′N, 78°24′W, 650–1,000 m, 19–28 Jun 1992, *Galo Tipaz et al. 1530* (MO); *1529* (MO); Sector Gualpí Medio, Río Canumbí, 01°02′N, 78°15′W, 1,150 m, 19–28 Feb 1993, *Armando Grijalva et al. 454* (MO, QCNE); *491* (MO, QCNE); *579* (MO, QCNE).

Anthurium sp. unknown #1 (Calomystrium)

Epiphytic; **internodes** short, 1.7 cm diam.; **cataphylls** persisting semi-intact; **petioles** 45 cm long, 3 mm diam. at middle, terete; geniculum ca. 2 cm long, drying

darker than petiole; **blades** broadly ovate-cordate, acuminate at apex, cordate at base, 26.7 cm long, 15.2 cm wide, 1.7 times longer than broad, 1.7 times longer than the petioles, broadest at or slightly above point of petiole attachment, subcoriaceous, moderately glossy on both surfaces, slightly bicolorous, drying medium yellow-brown; anterior lobe 19.5 cm long, broadly rounded; posterior lobes 7.5–8 cm long, 6.2–6.5 cm wide, directed inward, overlapping, at least upon drying; sinus obovate, 7 cm deep, 2 cm wide; **midrib** narrow, convex and slightly paler above, narrowly convex and paler below; **basal veins** 5 pair, first 2 free to base, the remainder coalesced for 2 cm, raised below, at least upon drying; **posterior rib** naked for 1.5 cm, curved; **primary lateral veins** 6 per side, departing midrib at ca. 60° angles, ascending to collective vein, etched-sunken above, somewhat acutely pleated-raised below; **tertiary veins** weakly visible below; **collective vein** arising from fourth or fifth basal vein, about as prominent as primary lateral veins, 1–5 mm from margin; INFLORESCENCES and INFRUCTESCENCES not seen.

The species is one of only three members of sect. *Calomystrium* found at La Planada. It is apparently rare, seen only once along the trail above La Posada. It is distinguished from the other known species of sect. *Calomystrium* at La Planada by having the primary lateral veins etched on the upper surface rather than narrowly raised as is the case with *A. ricaurtense*.

Although this is apparently a new species, it will not be described until fertile material becomes available.

Specimens examined: COLOMBIA. **Nariño:** Ricaurte, La Planada, 7 km above Chucunés on road between Tuquerres and Ricaurte, regrowth secondary forest with primary forest elements and trail above the La Posada, 01°05'N, 78°01'W, 1,780 m, 26 July 1988, *Croat 69582* (MO, PSO).

Anthurium sp. unknown #2 (Calomystrium)

Erect terrestrial, usually reclining on trees, or as an epiphytic climber; stems to ca. 3 m tall; **internodes** ca. 2.5 cm diam.; **petioles** 60–110 cm long (averaging 92 cm), 1 cm diam. at middle, drying nearly black; **blades** ovate-cordate, broadly acuminate at apex, cordate at base, 40–70 cm long, 30–45 cm wide (averaging 61 × 38 cm), 1.2–1.4 times longer than broad, .6–.8 times as long as the petiole, broadest at or near point of petiole attachment, subcoriaceous; drying densely dark-speckled-granular on both surfaces, upper surface sparcely dark glandular-punctate, drying gray-green and matte; lower surface sparcely medium brown, glandular-punctate, drying brownish grey, matte; **anterior lobe** 35–55 cm long, 30–45 cm wide; **posterior lobes** 12–20 cm long, 15–21 cm wide, directed inward; **sinus** obovate, 7–16 cm deep, 7–8 cm wide; **midrib** drying weakly raised and slightly darker above, acutely raised and concolorous below; **basal veins** 6–7 pair, drying weakly sunken above, narrowly raised and nearly black at base below, slightly coalesced; **primary lateral veins** 6–8 per side, departing midrib at an acute angle then spreading at 45–50° angle (to 30–45° toward apex), ascending to collective vein, drying weakly raised above, narrowly raised and bluntly acute below, the 1st & 2nd free to the base, the 3rd nearly free to the base, the remainder weakly coalesced 1–2 cm; **collective vein** originating from one of lowermost basal veins, 1–2 mm from margin. INFLORESCENCES and INFRUCTESCENCES not seen.

The species, which is probably an undescribed taxon will not be officially described until fertile material is acquired. Thus far it is known only from La Planada in Nariño Dept. in Colombia at 1,750 m elevation. It is a member of sect. *Calomystrium* characterized by its terrestrial habit and ovate-cordate grayish drying leaves with the basal veins free or only weakly coalesced, with glandular punctations on the lower surface and with the collective veins arising from near the base and coursing closely along the margin to the apex.

It is similar to *A. riparium*, a species that shares similar venation, has glands on the

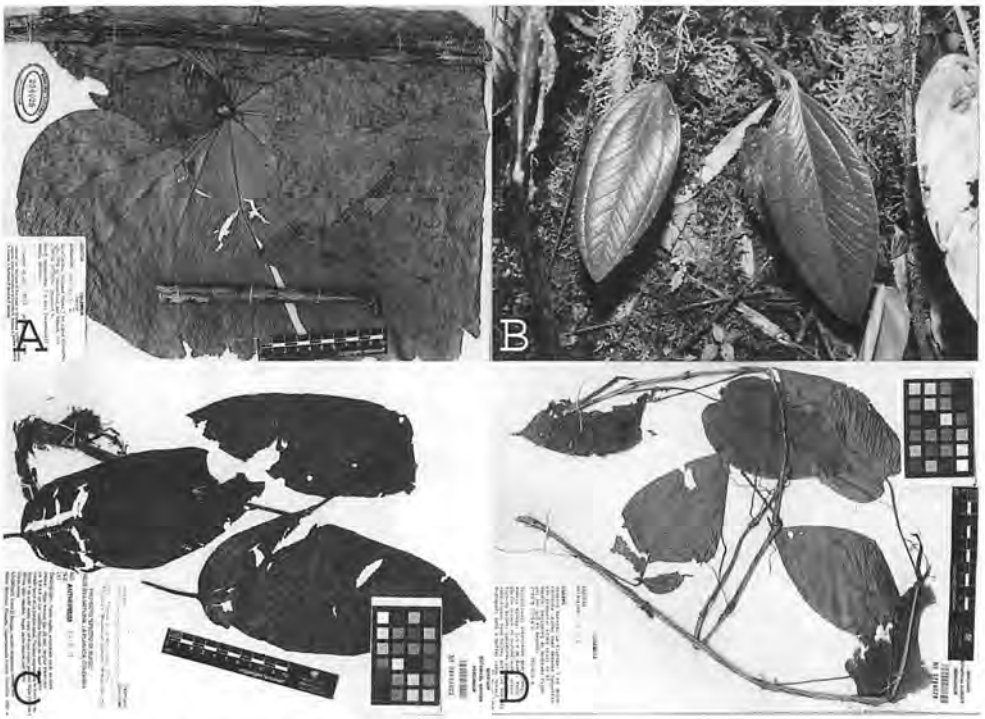

Fig. 34. a. *Anthurium species unknown # 2.* (*Gentry 35171*). a. Herbarium specimen. b. *Anthurium species unknown # 3.* (*Croat 71467*). b. Habit. c. *Anthurium species unknown # 4.* (*Restrepo 650*). c. Herbarium specimen. d. *Anthurium species unknown # 5.* (*Croat 71487*). d. Herbarium specimen.

lower surface, dries a similar color, and has densely brownish-speckled lower surface but that species differs in having upper blade surfaces which have dense raphide cells, and lacks glands on the upper surface while this species from La Planada has few or no raphide cells and has prominent glands on both surfaces. *Anthurium riparium* is also primarily found at low elevations, while La Planada is between 1,700 and 1,800 m.

Anthurium lactiflorum, another similar species, shares many characteristics with the La Planada species but differs in also having prominent raphide cells above and lacking glands on both surfaces.

Specimens examined: COLOMBIA. **Nariño:** Ricaurte, La Planada, Salazar Finca, 7 km above Ricaurte, 01°08′N, 77°58′W, 1,750 m, 29 Nov 1981, *Gentry et al. 35171* (MO); *Gentry et al. 35137A* (MO).

Anthurium sp. unknown #3 (Porphyrochitonium)

Epiphytic; **internodes** short, 5–8 mm diam.; **cataphylls** semi-intact above, brown and fibrous below, 5–6 cm long, drying reddish brown; **petioles** 13–16 cm long (averaging 14.5 cm), 2–3 mm diam., sharply C-shaped, sulcate; geniculum shaped as petiole, 2–3 cm long; **blades** elliptic, acute at apex, acute to rounded at base, 14–17 cm long, 6–7 cm wide (averaging 15.5 × 6.5 cm), 2.3–2.4 times longer than broad, ca. as long as petiole, broadest at or near middle, moderately coriaceous, glossy, conspicuously bicolorous; conspicuously glandular-punctate on both surfaces; **midrib** narrowly convex and slightly paler above, narrowly rounded and paler below; **primary lateral veins** 6–8 per side, departing midrib at 45°–60° angles,

etched, scarcely more conspicuous than the interprimary veins, less conspicuous than collective veins above, weakly raised and darker, much less conspicuous than collective veins below; **collective veins** arising from base, the inner pair stronger and extending to apex 8–11 mm from margin; the outer pair of collective veins running 1–2 mm from margin near the base and extending to the apex but becoming marginal in lower 1/3 of blade. INFLORESCENCES not seen.

This member of sect. *Porphyrochitonium* is apparently rare at La Planada, having been collected only once along the trail to El Hondón. It can be recognized by its nearly elliptic blades with 2 pairs of collective veins arising from the base, with glandular punctations on both surfaces, and relatively inconspicuous primary lateral veins.

Although this species is probably new to science, it is not officially described because the material available is sterile and inadequate.

Specimen examined: COLOMBIA. **Nariño:** Ricaurte, La Planada, 7 km above Chucunés (along road between Tuquerres and Ricaurte) along trail to El Hondón, beginning at Quebrada Tejón and for .5 km beyond, 01°08′N, 77°54′W, 780–800 m, 15 Mar 1990, *Croat 71467* (MO, PSO).

Anthurium sp. unknown # 4

Epiphyte; stem moderately short; **internodes** short, 2.0–2.5 cm diam., drying .7–1.5 cm diam.; **cataphylls** ca. 2.5 cm long, persisting as dark reddish brown fibers; **petioles** 27.5 cm long, subterete, sharply and narrowly sulcate adaxially upon drying, drying dark brown, matte, to 2 mm diam.; **blades** ovate-elliptic, 21–24.6 cm long, 8.3–10.8 cm wide, 2.3–2.8 times longer than broad, inequilateral with one side 4.7–10 mm wider, gradually short-acuminate at apex, rounded at base, dark green and semiglossy above, slightly paler and semiglossy below, drying nearly concolorous, dark yellowish brown on both surfaces; **midrib** drying narrowly rounded & slightly darker above, narrowly rounded and slightly paler below; **primary lateral veins** 8–9 pairs, arising at 55–70° angles; **collective veins** 2 pairs, the inner pair 8–13 mm from the margins midway, moderately loop-connected with the primary lateral veins, the outer pair arising from the base and merging with the margin in the lower 1/4 of the blade; upper surface drying matte, minutely papillate, eglandular; lower surface minutely dark granular and glandular-punctate; tertiary veins moderately obscure. INFLORESCENCE not seen.

Specimen examined: COLOMBIA. **Nariño:** Ricaurte, La Planada, Finca El Bosque, seccion Acantayac, vereda San Isidro, 01°10′00″N, 77°55′00″W, 11 Nov 1993, *Restrepo 650* (MO).

Anthurium sp. unknown #5 (Xialophyllium)

Terrestrial, often scandent; **internodes** elongate, 4–11.5 cm long, 3.5–4 mm diam., gray-green, weakly glossy; **cataphylls** intact at upper nodes, to 4.2 cm long, acuminate at apex, green turning brown, deciduous or persisting intact at upper nodes, drying reddish brown; **petioles** 7–12 cm long, 2–3 mm diam., sharply D-shaped, with a medial ridge toward apex; geniculum 4–6 mm long; **blades** narrowly ovate, acuminate to abruptly acuminate at apex, subcordate at base, 12–14 cm long, 6–8.5 cm wide, broadest at about lower 1/3, thinly coriaceous, matte, somewhat bicolorous; **posterior lobes** rounded, **sinus** rounded, broader than deep 4–8 mm deep; **midrib** deeply sunken and concolorous above, round-raised at apex, and slightly paler below; **basal veins** 2–3 pair, free to base; **primary lateral veins** 10–12 per side, sunken, more or less quilted above, pleated-raised below; interprimary veins present, scarcely less conspicuous than primary lateral veins upon drying; **basal veins** 3 pairs all free to the base; **tertiary veins** in part sunken above, raised below; **collective veins** arising from first pair of basal vein, 4–7 mm from margin.

Anthurium sp. unknown #5 is only known for certain from La Planada where

it is apparently rare as it was only collected once (*Croat 71487*). This species is a member of sect. *Xialophyllium*, distinguished by its long, slender gray-brown dried internodes, its deciduous cataphylls, slender sharply D-shaped petioles, narrowly ovate blades which are subcordate at the base and broadest at about lower 1/3 of the blade,

The species is closest to other undetermined material in Ecuador in Carchi Province (Río Verde including top of mountain which is similar in geologic format to Golondrinas Mountains), 00°52'N, 78°7'W, 1,870–2,400 m, 03 Dec 1987, *W. S. Hoover 2266*, MO, QCA) and *Croat & Whitehill 82761* in Pichincha Province (San Miguel de los Bancos Cantón, Nanegal to Mindo, 16.5 km SSW of Nanegalito, 00°01'14, 78°44'23"W, 1,500 m). The Hoover collection differs in having somewhat smaller blades (to 11 cm long) and drying more nearly concolorous with both surfaces light grayish green instead of having the upper surface dark gray-green and the lower surface drying moderately paler and yellow gray-green. The Croat & Whitehill collection from Pichincha differs in having the lower surface with scattered granules on the lower surface and in having the midrib and primary lateral veins glabrous or nearly so in contrast to having the lower surface smooth and faintly speckled whitish with prominently granular-puberulent major veins on the lower surface.

Specimen examined: COLOMBIA. **Nariño:** Ricaute, La Planada, Tuquerres - Ricaurte, La Planada, 7 km above Chucunés (along road between Tuquerres and Ricaurte) along trail to El Hondón, beginning at Quebrada Tejón and for .5 km beyond, 01°08'N, 77°54'W, 780–800 m, 15 Mar 1990, *Croat 71487* (MO, PSO).